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Published by: University of Groningen
Groningen
The Netherlands

Printed by: Ipskamp Drukkers B.V.

ISBN: 978-90-367-6549-7 (book)
978-90-367-6562-6 (e-book)

RIJKSUNIVERSITEIT GRONINGEN

Power and Supply Chain Integration

Proefschrift

ter verkrijging van het doctoraat in de
Economie en Bedrijfskunde
aan de Rijksuniversiteit Groningen
op gezag van de
Rector Magnificus, dr. E. Sterken,
in het openbaar te verdedigen op
18 november 2013
om 09.00 uur

door

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geboren op 16 maart 1981
te Sofia, Bulgarije

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ISBN: 978-90-367-6549-7 (book)
978-90-367-6562-6 (e-book)

To my mother

CONTENTS

CHAPTER 1
Introduction

The distribution of tasks between firms has drastically changed over the last century. In the beginning of the 20th century, firms strived to control the whole production process starting from raw materials and ending with end-consumer products. For example, by 1931 Ford did not only make and assemble all of its automobile parts but also owned production facilities for basic materials such as steel, glass and rubber (Nicholas, 1998). Such a set-up of the production process is hardly possible anymore. Fiercer competition on the global market and an increasingly demanding customer have pushed companies to focus on their core-business and outsource non-core activities. As such, firms are forced to rely on other firms to provide them with the inputs necessary to perform their task. In this division of tasks, every company adds value to a semi-finished product and sells it to the next firm until a final consumer product is realized. Literature refers to such networks of firms as supply chains.

A large body of literature emphasizes that the sequential tasks performed by the various firms in a supply chain create a need for integration between these firms (e.g. Frohlich & Westbrook, 2001; Maloni & Benton, 2000). When referring to such 'supply chain integration', researchers use alternative terms such as supply chain 'collaboration' or 'cooperation' and mention many different concepts and underlying items (e.g. Arshinder & Deshmukh, 2008; Chen & Paulraj, 2004; Croom et al., 2000; Ho et al., 2002; Tan, 2001). To reduce the confusion regarding what supply chain integration exactly is, Van der Vaart and Van Donk (2008) conducted a critical review on supply chain integration literature. These authors were the first to propose a classification which distinguishes three aspects of integration between buyers and suppliers: attitudes, practices and patterns. This classification was further theoretically explored and empirically validated by Vallet-Bellmunt and Rivera-Torres (2013).

"Attitudes" deal with the relational dimension of supply chain integration (Vallet-Bellmunt & Rivera-Torres, 2013, p.310). Attitudes reflect how buying and supplying firms feel about each other or towards supply chain integration in general (Van der Vaart

&Van Donk, 2008, p.47). Integration is higher[1] as these attitudes become more positive; for example when firms believe that they have common goals, when they trust each other and have the expectation of long term relationships (see e.g. Benton & Maloni, 2005; Fynes et al. 2005; Jayaram et al., 2004; Johnston et al., 2004; Kaufmann & Carter, 2006; Maloni & Benton, 2000; Prahinski & Benton, 2004; Shin et al., 2000; Ulaga & Eggert, 2006). "Practices" relate to the interaction dimension of supply chain integration (Vallet-Bellmunt & Rivera-Torres, 2013, p.310); practices are tangible activities or technologies that facilitate the exchange of resources between a focal firm with its suppliers and / or customers (Van der Vaart & Van Donk, 2008, p.47). Integration is higher as firms invest more in such activities and technologies; for example when firms invest in Electronic Data Interchange (EDI), Vendor Managed Inventories (VMI) and specialized packaging systems (see e.g. Dong et al., 2001; Frohlich & Westbrook; 2001; Kulp et al., 2004; Narasimhan & Nair, 2005; Sanders & Premus, 2005; Vickery et al., 2003). "Patterns" refer to the collaboration dimension of supply chain integration; patterns are strategic and organizational processes in which buying and supplying firms are jointly involved (Vallet-Bellmunt & Rivera-Torres, 2013, p.310). Integration is higher as firms are involved more in such processes; for example when firms have high corporate level communication on important issues with key suppliers, when they plan jointly or make strategic decisions jointly (see e.g. Gimenez & Ventura, 2003; 2005; Li et al., 2006; Stank et al., 2001; Stanley & Wisner, 2001). I will use this classification for developing the theoretical framework in this thesis.

Most literature explicitly or implicitly assumes that firms should pursue maximal supply chain integration to achieve the best outcome for all firms involved (see Van der Vaart & Van Donk, 2008, for a recent overview of literature on supply chain integration and performance). In support of this assumption, it has theoretically been argued that supply chain integration reduces the transaction costs of producing and distributing a good or service, increases revenue through reducing uncertainty for the buyer and the supplier, and enhances supply chain responsiveness (Maloni & Benton, 2000). Furthermore, practical examples of the advantages of supply chain integration are abundant. By synchronizing their activities with suppliers, firms like Procter and Gamble or Wal-Mart have dramatically cut inventory costs and throughput times and thus strengthened their competitive position. Finally, a substantial number of empirical

[1] Please note that although the integration examples presented are bilateral (e.g. both firms involve each other in their decision making), as shown by Arshinder & Deshmukh (2008) supply chain integration is not necessarily considered a bilateral concept in literature.

studies shows a positive link between supply chain integration and firm performance (e.g. Devaraj et al., 2007; Frohlich & Westbrook, 2001; Li et al., 2005; Rosenzweig et al., 2003).

Yet, supply chain integration is not as straightforward as it initially might seem. First, studies empirically found that supply chain integration does not necessarily enhance firm performance (Das et al., 2006; Gimenez et al., 2012). As I will elaborate further on, negative performance effects due to SCI are to be expected if firms do not find a fit between integration and the environment in which they operate (e.g. Chen et al., 2004; Fisher, 1997; Van der Vaart & Van Donk, 2008; Zhou & Benton, 2007). Although there are strong indications that integration is not always beneficial and should not always be pursued by firms, currently there is insufficient understanding how the environment exactly influences supply chain integration (and firm performance). Second, Van der Vaart and Van Donk (2008) criticize existing literature for treating integration as a uni-dimensional concept. As such, they put forward that little consideration has been paid to the distinctive roles that attitudes, patterns, and practices fulfill within buyer-supplier exchanges. In sum, oversimplification due to these two points limits our understanding of when different aspects of supply chain integration are likely to occur, and how exactly they serve the interest of the participating firms. This gap in our understanding needs to be addressed in order to advance the field of supply chain integration both theoretically and practically.

In this thesis, I aim to address this gap by investigating how the various aspects of supply chain integration (i.e. attitudes, practices, and patterns) are influenced by the resource dependence setting in which firms operate. In line with the concept of a supply chain, resource dependence theory (RDT; Pfeffer & Salancik, 1978) stresses that firms in a supply chain are dependent on each other for critical resources such as materials and money. Yet, the theory emphasizes that the resource dependences of firms can vary; the dependence of a firm can be high on one supply chain partner and low on another. At a first glance, RDT indicates that the more resource dependent a firm is on another firm, the more that firm will be motivated to maintain and strengthen the relationship with the respective other firm. In other words, the theory implies that resource dependence leads to the pursuit of supply chain integration.

On closer investigation, resource dependence theory states that taking into account only the resource dependence of one firm is insufficient. Instead, the resource dependences of both the buyer and the supplier need to be considered when explaining

the integration between them (e.g. Casciaro & Piskorski, 2005; Gulati & Sytch, 2007). Especially the difference in resource dependences is thought to be of crucial importance in buyer-supplier exchanges (Emerson, 1962; Pfeffer, 1972; Pfeffer & Salancik, 1978). This difference in resource dependences is popularly known as 'power'. Power is important as it gives the less dependent firm the ability to structure the exchange of resources with the more dependent firm as it likes (e.g. Burt, 1983; Emerson, 1962; Friedkin, 1986; Lawler & Bacharach, 1987; Pfeffer & Salancik, 1978; Pfeffer & Leong, 1977; Piskorski & Casciaro, 2006; Porter, 1980; Provan et al., 1980; Van de Ven et al., 1976). While various researchers acknowledge that power should have a great impact on buyer-supplier integration (and the performance that firms derive from the exchange), little empirical work has been conducted to investigate its exact effects (e.g. Casciaro & Piskorski, 2005; Pfeffer & Salancik, 2003). Particularly little is known about how power affects the various aspects of supply chain integration (i.e. attitudes, practices, and patterns) and how this serves the interest of buying and supplying firms.

The current thesis aims to contribute to supply chain theory and resource dependence theory by investigating the effects of power (which as I will explain later is a central tenet of resource dependence theory) on the three above-mentioned aspects of supply chain integration. Below, I first discuss the theoretical foundations of this thesis. Thereafter, we briefly describe its three empirical chapters.

THEORETICAL FOUNDATIONS

Power is a much discussed topic in organizational literature (e.g. Stinchcombe, 1959; Thompson, 1967). Authors have used different perspectives on power (as illustrated in Figure 1.1). First, researchers focus on the *power of one firm relative to the other firm* (e.g. Galbraith, 1952; Kumar et al., 1995; Pfeffer & Salancik, 1978). The power of one firm is higher as the resource dependence of his counterpart minus his own resource dependence is higher. By definition, the power of the other firm is lower as the power of the first firm is higher (Galbraith, 1952). Thus, as buyer power is higher, supplier power is lower, and vice versa. Second, authors have argued that a *power imbalance* (a.k.a. power inequality) affects buyer-supplier exchanges (e.g. Casciaro & Piskorski, 2005; Hingley, 2005; Kumar et al., 1998; Piskorski & Casciaro, 2006). Power imbalance is defined as the absolute difference between the resource dependences of the buyer and the resource dependence of the supplier. A power imbalance occurs if either

the buyer or the supplier has a power advantage (i.e. if the resource dependence of a firm is lower than the resource dependence of his counterpart). These studies have thus emphasized that the extent of the power advantage of either the buyer or the supplier matters, but that it does not matter for supply chain integration who precisely (i.e. the buyer or the supplier) carries the power advantage. Third, studies have emphasized that the power advantage of a *specific* supply chain actor affects buyer-supplier integration and performance (e.g. Kraljic, 1983; Mudambi & Helper, 1998; Porter, 1980). Studies taking this perspective on power argue that buyer-supplier exchanges may be affected differently when the power advantage of the buyer is higher compared to when the power advantage of the supplier is higher (Gulati & Sytch, 2007).

In this thesis, I argue that a different perspective on power is relevant for each aspect of supply chain integration. As shown in Figure 1.1, I link buyer power to attitudes (chapter 2), power imbalance to practices (chapter 3), and the power advantage of the buyer to patterns (chapter 4). In the following sections I will explain why each perspective of power is relevant to the corresponding integration aspect.

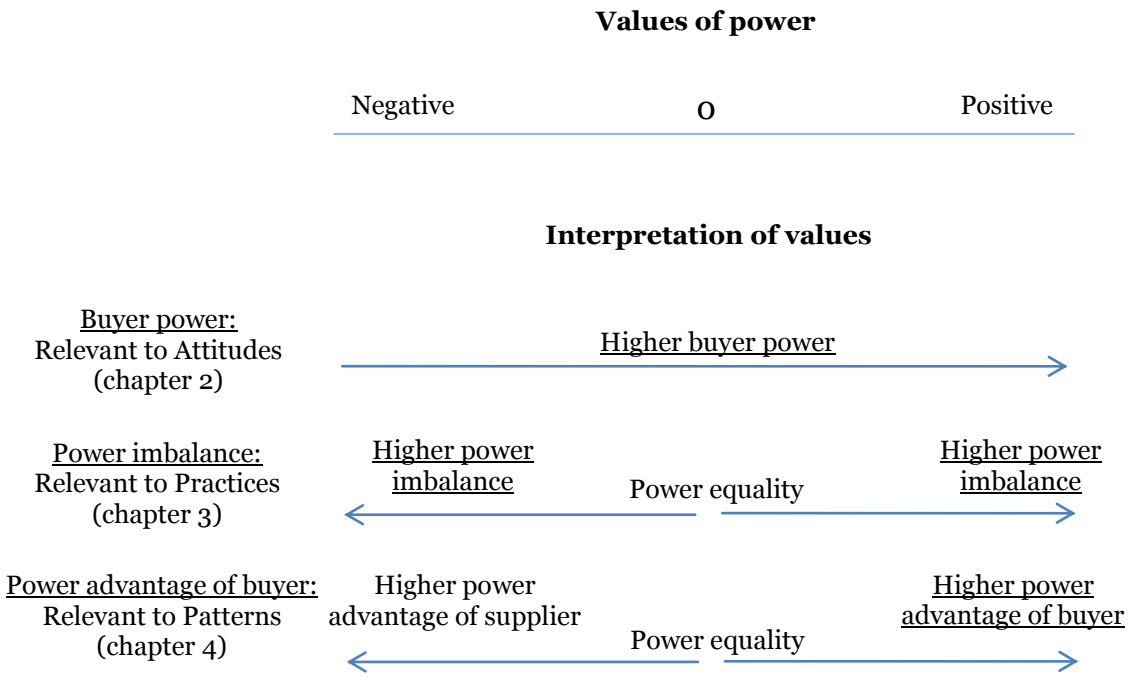

Figure 1.1: Perspectives on power and their link with attitudes, practices, and patterns

Study 1: Attitudes

An important element of 'attitudes', namely 'supply chain governance', is discussed in detail within the marketing and strategy literature. To stay congruent with these streams of literature to which I refer whilst building hypotheses, I prefer to use the term 'supply chain governance' also in this thesis. Supply chain governance can be seen as an attitude aspect of supply chain integration because the way the chain is governed is based on specific beliefs of de supply chain partners and beliefs are the core elements of attitudes (Fishbein & Ajzen, 1975). I will highlight these beliefs below.

As I will elaborate in more detail in chapter 2, literature distinguishes two types of supply chain governance: relational and transactional governance. Relational governance is a form of inter-firm governance that relies on non-market mechanisms. If relational governance is high, firms believe that they pursue common goals, they are benevolent towards each other and they are willing to jointly evaluate how they function as a dyad. Transactional governance is a form of inter-firm governance that relies on market-mechanisms. If transactional governance is high, firms believe that there is high conflict potential due to competing interests, and have a desire to lock down all agreements in contracts. Both modes of governance in supply chain dyads thus occur on a firm level based on the interests of the firm rather than on an interpersonal level based on human relationships.

I will argue that buyers generally have a greater interest in relational governance (as it provides the buyer more flexibility to change his resource requirements), and that suppliers have a greater interest in transactional governance (as it provides the supplier more certainty about the resource requirements of the buyer and the task that the supplier needs to perform). Therefore, I expect that as the power of the buyer is higher (and by definition as the power of the supplier is thus lower), relational governance will be higher and transactional governance will be lower. I will also argue that in such a situation supplier performance will be higher which is in the interest of the buyer.

Study 2: Practices

In the second study, I investigate how the resource dependence setting relates to investments in transaction specific assets (TSAI) in various areas of the production systems of buyers and suppliers such as IT systems, implementation of production practices, facilities, equipment, and training of personnel. These investments are at the core of the concept 'practices' (Van der Vaart & Van Donk, 2008).

I expect a moderated link between power imbalance and TSAI. As elaborated in chapter 3, I argue that 'total dependence' acts as a moderator on this link. Total dependence is the second tenet of resource dependence theory and is defined as the sum of resource dependences of the buyer and the supplier. I argue that when total dependence is high, power imbalance has a positive link with TSAI and that when total dependence is low, power imbalance has a negative link with TSAI. The reasoning behind this expected moderation is that the powerful has two options: he can either promote or block TSAI, and as he is more powerful he is more able to promote respectively block. If total dependence is high, as I will explain in detail in chapter 3, the powerful has reasons to promote TSAI. For one, the benefits of securing the exchange of resources through TSAI are likely to weigh against the costs of TSAI if total dependence is high. Second, under high total dependence, the risk of relationship termination is low and the powerful firm has little reason to protect his bargaining position (which is not very strong). Under high total dependence, the benefits of TSAI are thus likely to weigh against the loss of bargaining power that would emerge from further committing himself to the relationship through TSAI. Third, the powerful firm may be more aware of opportunities to create value through TSAI if total dependence is higher. In contrast, if total dependence is low, the costs of TSAI may not exceed the benefits, the powerful firm may opt to protect his bargaining position, and he may not be aware of opportunities for creating value through TSAI.

Study 3: Patterns

In the third study, I pose that the resource dependence setting is of importance when studying the involvement of the supplier in the decision making of the buyer. Such involvement of the supplier in the decision making of the buyer can occur in various areas (e.g. in product design, process design, cost control). In the classification of Van der Vaart and Van Donk (2008), supplier involvement is included in the 'patterns' aspect. In this study, I focus on supplier involvement and do not cover other patterns such as buyer involvement, visits to each other's facilities, or communication frequency (Van der Vaart & Van Donk, 2008). As I will lay out in detail in chapter 4, supplier involvement is an especially interesting part of 'patterns'. On one hand, there is abundant evidence that buyers need to involve their suppliers in their business in order to stay competitive (e.g. Frohlich & Westbrook, 2001; Primo & Amundson, 2002; Ragatz et al., 2002; Van der Vaart & Van Donk, 2008) and that technology uncertainty increases

the need for supplier involvement (e.g. Chen & Paulraj, 2004; Paulraj & Chen, 2007; Zhou & Benton, 2007). On the other hand, practitioners have also received normative recommendations to maintain distance to their suppliers in order to protect their competitive advantage and bargaining position (Kraljic, 1983; Porter, 1980). It is of scientific and practical relevance to better understand when buyers involve their supplier and when they prefer to keep them at a distance.

In line with literature, I expect that supplier involvement is higher as technology uncertainty at the buyer is higher. Such technology uncertainty exists if there are unpredictable changes in products and processes at the buyer side (e.g. Dess & Davis, 1984; Miller & Friesen, 1983; Zhou & Benton, 2007). As described in chapter 4, buyers may want to involve suppliers in their decision making processes to counteract technology uncertainty and to assure the flow of materials throughout the supply chain (Chen et al., 2004; Fynes et al., 2005; Galbraith, 1973; Jap, 1999; Paulraj & Chen, 2007; Stock & Tatikonda, 2008; Tushman & Nadler, 1978; Zhou & Benton, 2007). Yet, I argue that while technology uncertainty at the buyer increases the need for supplier involvement, a buyer who has a large power advantage (i.e. buyer dependence is low, supplier dependence is high) may block supplier involvement in order to shield strategic information critical to his competitive advantage and bargaining position. In all other resource dependence settings, I expect that higher technology uncertainty is associated with higher supplier involvement. Thus, opposed to chapter 3, where the extent of the power advantage matters and not whether the buyer or the supplier has the power advantage, in chapter 4 it is important who has the power advantage.

CONCLUSIONS

In summary, this thesis research was conducted in order to better understand under which power conditions the various aspects of supply chain integration are likely to occur. First, I laid out that as buyer power is higher, governance between buyers and suppliers is shaped more in the interest of the buyer. This means that as buyer power is higher, relational governance is higher and transactional governance is lower, and supplier performance is consequently higher. This first study of the thesis is described in chapter 2. Second, I posed that the power imbalance between buying and supplying firms is significantly linked to TSAI, and that this effect is moderated by total dependence. When total dependence is high, TSAI are higher as power imbalance is

higher. When total dependence is low, TSAI are lower as power imbalance is higher. This second study of the thesis is laid out in chapter 3. Third, I argued that the power advantage of the buyer is relevant for the level of supplier involvement in the decision making of the buyer. In specific, I expect that the link between technology uncertainty and supplier involvement is moderated by the power advantage of the buyer; if the buyer has a power advantage, I expect a negative link. In all other power settings, I expect a positive link. This third empirical study is reported in chapter 4. All three empirical studies are illustrated in Figure 1.2, 1.3, and 1.4. These studies are written as separate studies which can be submitted to scientific journals separately. As such, they can be read independently and therefore there is a slight overlap in content.

Figure 1.2: Study 1. The link between buyer power, governance, and supplier performance.

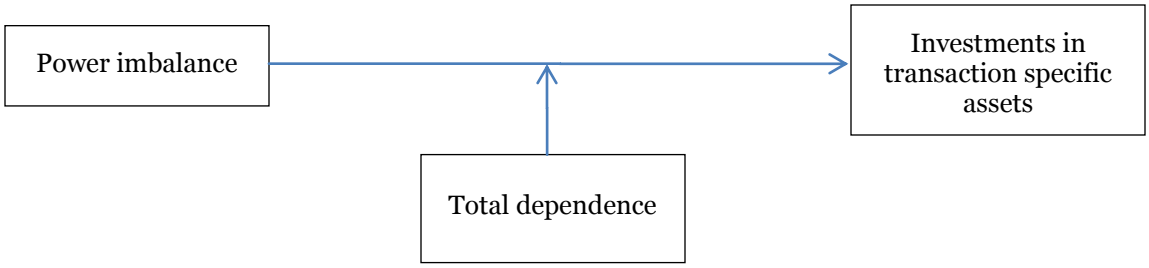

Figure 1.3: Study 2. The link between power imbalance and investments in transaction specific assets is moderated by total dependence.

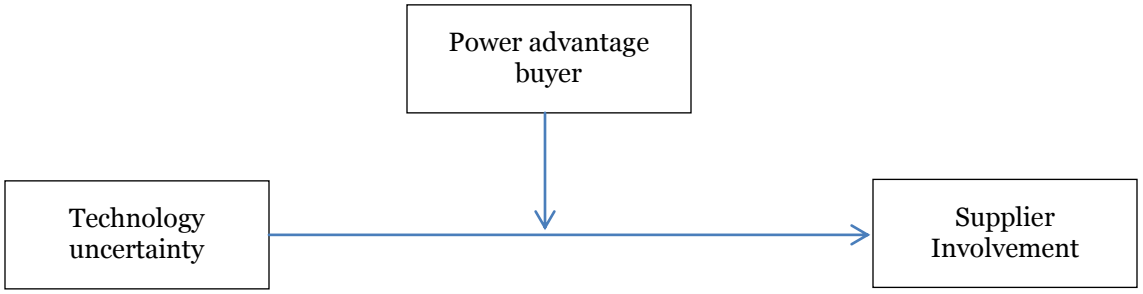

Figure 1.4: Study 3. The link between technology uncertainty and supplier involvement is moderated by the power advantage of the buyer.

CHAPTER 2

How and why does power affect governance and supplier performance?

INTRODUCTION

Although the power of buyers and suppliers has been studied in literature, our understanding of how and why it influences supplier performance is incomplete. In this study I posit that power affects supplier performance through two independent and complementary types of governance: relational governance and transactional governance. I theorize that the less power the buyer has relative to the supplier, the lower relational governance and the higher transactional governance is. I will argue that this governance is associated with lower supplier performance. Power is defined as the difference in resource dependences between firms (Gulati & Sytch, 2007; Kumar et al., 1995; Pfeffer & Salancik, 1978; Piskorski & Casciaro, 2006). By definition, higher power of the buyer implies lower power of the supplier and vice versa (Galbraith, 1952). Relational governance is a form of inter-firm governance that relies on non-market mechanisms (i.e. shared social norms and beliefs, e.g. Artz & Brush, 2000; Brown et al., 2000; Ferguson et al., 2005; Grandori, 1997; Lusch & Brown, 1996; Noordewier et al., 1990; Patnayakuni et al., 2006; Stephen & Coote, 2007). Transactional governance is a form of inter-firm governance that relies on market-mechanisms which entail a high conflict potential due to competing interests and a desire to lock down all agreements in contracts (Brown et al., 2000; Ferguson et al., 2005; Heide & John, 1992; Joskow, 1985; Lusch & Brown, 1996; Macneil, 1980; Morgan & Hunt, 1994; Noordewier et al., 1990; Ring & van, 1992; Williamson & Winter, 1993). Supplier performance is defined as the satisfaction of the buyer on a wide range of aspects of the value-proposition that the supplier provides to him (e.g. Anderson & Narus, 1990; Ferguson et al., 2005; Gulati & Sytch, 2007; Mohr & Spekman, 1994; Poppo & Zenger, 2002; Saxton, 1997).

While power has been identified as a tenet which greatly affects the value that actors derive in their relationships with others (e.g. Emerson, 1962; Pfeffer & Salancik, 1978), literature has been ambiguous with respect to how and why supplier performance is affected by power in buyer-supplier dyads. On one hand, authors claim that power and supplier performance have a direct linear relationship. In specific, it is reasoned that the more power the buyer has in the relationship, the more able he is to extract higher

supplier performance (Aldrich, 1979; Blau, 1964; Cook, 1977; Dore, 1983; Gulati & Sytch, 2007; Kim et al., 2004; Pfeffer & Salancik, 1978). On the other hand, as I will explain in more detail further on, authors argue that power affects supplier performance through governance and that the effect of power on governance and supplier performance is inverted V-shaped; the larger the power imbalance[2] in the relationship, the more buyer-supplier relationships are thought to amount to lower relational governance and higher transactional governance which is argued to decrease supplier performance (Bretherton & Carswell, 2002; Doney & Cannon, 1997; Gulati & Sytch, 2007; Kumar, 1996; Kumar et al., 1998; Piskorski & Casciaro, 2006; Pole & Haskell, 2002).

These opposing views on the effects of power on supplier performance form a theoretical gap: how and why does power influence supplier performance? This research gap needs to be addressed to develop a fuller understanding of the role of power in supply chain dyads. The current lack of understanding also leaves practitioners with real dilemmas. While popular purchasing literature advises buying firms to increase their power to achieve higher supplier performance (e.g. Kraljic, 1983; Olsen & Ellram, 1997), it is unclear if buying firms with higher power achieve higher or lower supplier performance and how exactly they are able to achieve this. Should buying firms pursue high power to achieve the highest supplier performance or should they rather strive for power balance as the inverted V-shaped adherents would advocate? And how should they use their power? This study addresses both the theoretical gap and the practitioner dilemmas and thus contributes to further theory development and business practice.

In this study, I reason that the effects of power can be better understood by combining both streams of literature mentioned above. In line with the first stream, I expect a linear effect and not an inverted V-shaped effect of power on governance and supplier performance. I reason that buyers will always request suppliers to provide them the resources they need in terms of e.g. component quality, speed, flexibility, cost, and that suppliers will respond less to such requests as buyers have less power (Ambrose et al., 2010; Gulati & Sytch, 2007; Hingley, 2005; Kauffman & Wang, 2001; Kraljic, 1983; Rezabakhsh et al., 2006; Wathieu et al., 2002). Yet, in line with the second stream, I reason that, because power needs to be utilized in order to achieve a certain supplier performance, the relationship between power and supplier performance is mediated by governance. As buyers have more power, suppliers are more responsive to their requests,

[2] A power imbalance arises if either the buyer or the supplier has a power advantage over the other firm; as the difference in resource dependences is larger, power inequality is larger (e.g. Gulati & Sytch, 2007).

and buyers will be more able to achieve governance that is suited to meet their (i.e. the buyers') interests.

As I will argue in more detail in the Theory section, there is a greater need of buyers for relational governance as it allows them flexibility regarding the quantity and specifications of the products to be delivered by suppliers (e.g. Ambrose et al., 2010; Eisenhardt & Schoonhoven, 1996; Johnston et al., 2004; Joshi & Campbell, 2003; Wei & Wang, 2007). Transactional governance, however, is more necessary for suppliers who benefit from committing buyers to a specified product and quantity by means of, for example, written agreements and contracts (e.g. Bowen & Jones, 1986; Bradach & Eccles, 1989; Heide & John, 1990; Zenger et al., 2002). Because each party will shape governance to his interest, I thus expect that as the buyer has more power, levels of relational governance will be higher and levels of transactional governance will be lower, and consequently supplier performance will be higher.

This study is novel as it combines existing theories to argue the effects of power on supplier performance through governance. Previous papers have argued the effects of power in supply chains either based on psychological literature that describes cognitive reactions of individuals to power imbalance or on classical power literature on firm interactions which does not elaborate on how power is utilized. I combine both streams of literature in order to reason how power influences governance and supplier performance in buyer-supplier dyads. This study thus complements existing power literature in two ways. First, instead of assuming that the effects of power are universal for all human interactions due to the 'nature' of humans, I motivate that for buyer-supplier relationships the effects of power are shaped by the roles which actors fulfill in the supply chain. This reasoning thus stipulates the importance of these roles for the expected effects of power, should I find that the hypotheses are confirmed. Second, I argue that power needs to be utilized to achieve a desired outcome. This study thus complements classical power literature on firm interactions that argues that power enables actors to pursue their interest but does not elaborate on how exactly this interest is pursued.

I test the hypotheses through carefully constructed research procedures and using primary data. This study is based on a survey of 125 buyer-supplier relationships in the Dutch discrete manufacturing industries and is illustrated by a case study of one NASDAQ listed buyer and his key suppliers.

THEORETICAL FRAMEWORK

In this study, I study the effect of power on supplier performance through governance. I first describe the theoretical constructs. Thereafter I show how these constructs relate to each other and develop hypotheses.

Power

Power in supply chains emerges when buyers and suppliers are resource dependent on each other. Resource dependence indicates the extent to which a firm needs to maintain the exchange of resources with their current partner and reflects the number of alternative partners a firm has in the short respectively long run, switching costs to an alternative partner, and disruption costs when the relationship is terminated (e.g. Brass, 1984; Burt, 1982; Gulati & Sytch, 2007; Kumar et al., 1995; Kumar et al., 1998). In congruence with other studies, the concept of power is defined as the difference in resource dependences of firms. Power thus reflects the relative power of one firm compared to the other firm (Gulati & Sytch, 2007; Kumar et al., 1995; Pfeffer & Salancik, 1978; Piskorski & Casciaro, 2006).

In this study, I take the relative power of the buyer as a departing point. The relative power of the buyer is defined as the difference in the resource dependence of the supplier minus the resource dependence of the buyer. Positive respectively negative buyer power indicates that the resource dependence of the buyer is lower respectively higher than the resource dependence of the supplier, and thus that the buyer has more respectively less power than the supplier. When buyer power equals zero, the buyer and the supplier are equally resource dependent on each other. Buyer power is higher (and by definition supplier power is lower) as I move from the left to the right in Figure 2.1.

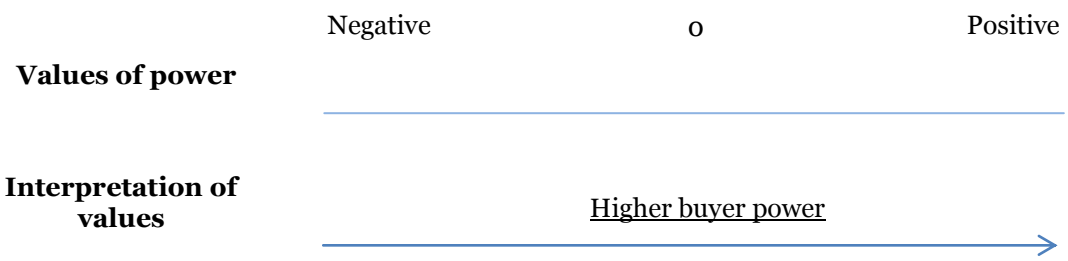

Figure 2.1: Illustration of the concept of power in this study

Governance

Relational governance is a form of inter-firm governance that relies on non-market mechanisms (i.e. shared social norms and beliefs, e.g. Artz & Brush, 2000; Brown et al., 2000; Ferguson et al., 2005; Grandori, 1997; Lusch & Brown, 1996; Noordewier et al., 1990; Patnayakuni et al., 2006; Stephen & Coote, 2007). Transactional governance is a form of inter-firm governance that relies on market-mechanisms which entail a high conflict potential due to competing interests and a desire to lock down all agreements in contracts (Brown et al., 2000; Ferguson et al., 2005; Heide & John, 1992; Joskow, 1985; Lusch & Brown, 1996; Macneil, 1980; Morgan & Hunt, 1994; Noordewier et al., 1990; Ring & van, 1992; Williamson & Winter, 1993). While it is conceptually convenient to consider relational and transactional governance as extremes on the same continuum (e.g. Dwyer et al., 1987; Dyer & Singh, 1998; Gulati, 1995; Larson, 1992; Macaulay, 1963; Morgan & Hunt, 1994; Nevin, 1995; Uzzi, 1997), nowadays many scientists carry the conviction that the modes are unrelated and can occur independently and without trade-offs (Cannon et al., 2000; Dwyer et al., 1987; Ferguson et al., 2005; Geyskens et al., 2006; Macneil, 2000; Morgan & Hunt, 1994; Nevin, 1995; Styles & Ambler, 2003) or that they can even act as complements (Liu et al., 2009; Poppo & Zenger, 2002). It is argued that the modes are independent; relational governance can occur simultaneously with transactional governance because "people really do act and think as if discrete transactions exist outside of relations" (Macneil, 2000). Furthermore, the modes can act as compliments; a firm can use detailed contracts in the part of the inter-firm exchange with high conflict potential due to competing interests, and utilize relational governance in the rest of the exchange (Ferguson et al., 2005). Therefore, separate hypotheses for both modes will be formulated in this study.

Supplier performance

In congruence with prior studies in strategy literature, I define supplier performance as the satisfaction of the buyer on a wide range of aspects of the value-proposition that the supplier provides to him (e.g. Anderson & Narus, 1990; Ferguson et al., 2005; Gulati & Sytch, 2007; Mohr & Spekman, 1994; Poppo & Zenger, 2002; Saxton, 1997). Conceptually, the construct of supplier performance should reflect "an encompassing view related to the profitability engendered from creating value in the eyes of the customer" (Ferguson et al., 2005). In line with this reasoning, a multi-facetted approach to buyer evaluations to capture outcome variables such as costs, quality, delivery

reliability, flexibility and customer service is supported by various researchers (e.g. Bello et al., 2003; Cannon et al., 2000; Noordewier et al., 1990; Paulin et al., 1997; Sirdeshmukh et al., 2002) and is also used in this study.

Power as a driver for governance and supplier performance

In this section I acknowledge existing literature on the effects of power on governance and supplier performance. I point out that the reasoning presented in this literature needs to be adapted to suit buyer-supplier relationships and distill hypotheses for this specific setting.

Power imbalance and inverted V-shaped effects of power

Prior studies on power have stipulated that power imbalance introduces disregard for each other's interests to the relationship. First, research on the effects of power on cognitive processes and information processing has indicated that as the power advantage of an individual grows, he feels less need to devote cognitive effort in observing and interpreting the behavior of the less powerful individual (e.g. Dépret & Fiske, 1999; Fiske, 1993; Fiske et al., 2004). Due to this inclination of the powerful actor, the less powerful actor will feel unable to voice his interest and consequently his interests will be neglected even more. Second, studies have argued that, as their power grows, power advantaged actors have more opportunities to inflict damage on the power disadvantaged (e.g. Cook & Emerson, 1978; Giebels et al., 2000). Because of the opportunistic nature of humans, it is reasoned that powerful firms will seize such opportunities and utilize their power to increase their performance at the expense of the weaker firm; in response the weaker firm will cheat the stronger firm whenever this goes unnoticed (Blau, 1964; Burt, 1980; Burt et al., 1980; Hingley, 2005; Keltner & Robinson, 1997; Kim et al., 2004; Kumar et al., 1995; Lawler & Yoon, 1996; Perrow, 1970; Thompson, 1967; Williamson, 1985).

Assuming opportunism of both firms and expecting the behaviors that arise from it, a growing power imbalance is reasoned to affect the governance modes and supplier performance as follows (e.g. Casciaro & Piskorski, 2005; Gulati & Sytch, 2007; Hingley, 2005; Kumar et al., 1998; Piskorski & Casciaro, 2006). First, these authors argue that as power imbalance is higher, transactional governance will increase; there will be more conflicts due to more opportunism, and more contracts will be applied to set boundaries to opportunistic actions. In addition, it is argued that relational governance is lower as

power imbalance is higher; the powerful firm will simply impose his will on the weaker firm. It is reasoned that due to higher transactional and lower relational governance, the value generating potential of the buyer-supplier relationship is lower. This is argued to decrease supplier performance. In sum, it is thought that as the power imbalance between buyer and supplier increases, supplier performance is lower due to higher transactional and lower relational governance (e.g. Gulati & Sytch, 2007; Kumar et al., 1998). These arguments support a V-shaped effect of power.

The few studies that have tried to test (part of) this logic for the context of buyer-supplier relationships have not produced clear results. Gulati and Sytch (2007) found only partial support for inverted V-shaped effects of power; supplier performance was lower as the power advantage of the buyer was higher but there was a null effect for the cases in which the supplier had the power advantage. Furthermore, while the authors argued that the significant effect for the cases in which the buyer has the power advantage may be due to a deteriorated buyer-supplier relationship, they did not explicitly test for such mediation effects. Adding to the discrepancy in literature, while Kumar et al. (1995; 1998) showed that the relationship between buyer and supplier worsens as power imbalance increases (thus promoting an inverted V-shape), the study of Lusch and Brown (1996) indicates a linear effect of buyer power on governance instead of a V-shaped effect.

Moreover, there are indications that the logic supporting the V-shape might not hold. First, opposing the assumption that all firms are opportunists who are inclined to spite and cheat each other, recent studies on buyer-supplier relations have produced abundant evidence that firms may also tolerate or even respect each other's success (e.g. Benton & Maloni, 2005; Brown et al., 1995; Geyskens et al., 1999; Hingley, 2005; Maloni & Benton, 2000; Rezabakhsh et al., 2006; Wu et al., 2004; Zhao et al., 2008). Second, literature has documented that regardless of their power position, buyers always voice their interests within the relationship and keep requesting that their interests are met as long as these have not been met by the supplier (e.g. Gulati & Sytch, 2007; Hingley, 2005; Kraljic, 1983; Lilliecreutz & Ydreskog, 1999; Oosterhuis et al., 2011). Third, there is evidence that suppliers are not ill-disposed towards buyers. On the opposite, the essence of the marketing philosophy of many suppliers is "the satisfaction of customers' needs and wants through the provision of the right products and services, in the right place at the right price" (Brassington & Petitt, 1997). Many organizations have adopted

this customer-centered philosophy and emphasize that their business revolves around providing value to their customers.

In sum, there is sufficient reason to doubt if a power imbalance affects governance and supplier performance in buyer-supplier dyads as assumed by some authors (i.e. that the effects of power are V-shaped; the higher the power of the more powerful is, the more he will impose higher transactional governance and pursue lower relational governance, and this in turn will decrease supplier performance). Therefore, in the next section I develop an alternative logic for the effects of power which I believe is more suitable to explain governance and supplier performance between buyers and suppliers. I will outline the support in literature that buyer power linearly affects supplier performance through governance and formulate the respective hypotheses.

The effects of power in buyer-supplier dyads: a linear relationship

While buyers and suppliers are not necessarily hostile towards each other, they face a basic conflict of interest within their relationship; buyers want to pay the lowest component price for a maximal level of quality, reliability, innovativeness, etc. as this results into the lowest costs and highest revenue generating potential for them, while suppliers want to get the highest component price without making extra investments to increase quality, reliability, innovativeness, etc. as this allows them to achieve the highest revenue at the lowest cost. Buyers and suppliers thus prefer supplier performance within the relationship to move into opposite directions (e.g. Blau, 1964; Dore, 1983; Gelderman & Van Weele, 2002; Gulati & Sytch, 2007; Perrow, 1970). Literature states that a firm will be more able to pursue his interest and solve this conflict to his benefit as he has more power (Burt, 1983; Emerson, 1962; Lawler & Bacharach, 1987; Pfeffer & Salancik, 1978; Pfeffer & Leong, 1977; Provan et al., 1980; Van de Ven et al., 1976). This is confirmed by studies that investigate relationships between supplying firms and end-consumers. Such studies indicate that whenever the end-consumer market is strongly fragmented while suppliers are relatively few (i.e. suppliers are more powerful than end-consumers) end-consumers do not have much influence on supplier performance (Rezabakhsh et al., 2006). Similarly, for business-to-business settings it has been documented that less powerful buyers are less satisfied with supplier performance; powerful suppliers target weaker buyers with pre-determined products at pre-determined prices (Wathieu et al., 2002) leaving them with a take-it-or-leave-it choice (Kauffman & Wang, 2001). In sum, I expect that the perceived supplier performance will

be lower as buyers have less power (Ambrose et al., 2010; Hingley, 2005; Kraljic, 1983). Vice versa, the same studies argue that as buyers have more power, suppliers become more customer oriented and are more willing to accommodate the wishes of the customer:

H1: As buyers have more power, supplier performance is higher.

As firms need to utilize their power in order to achieve the supplier performance they desire (e.g. Pfeffer & Salancik, 1978), I expect that the effect of power on supplier performance is mediated by governance. While relational and transactional governance are beneficial to both buyers and suppliers to some extent (i.e. both firms may benefit from making clear agreements through transactional governance, and both may benefit from building in some flexibility through relational governance), I will argue that the benefit for each governance mode differs for buyers versus suppliers. As I will lay out, therefore as one of the firms has more power, he will establish relatively more of one governance type than if the other firm has more power. To be specific, I will argue that relational respectively transactional governance will be higher respectively lower as the buyer has more power (and the supplier thus has less power).

Literature has indicated that buyers generally have a higher need for relational governance than suppliers (Ferguson et al., 2005; Joshi & Campbell, 2003). Buyers want suppliers to deliver according to buyer specifications and accommodate changes therein (Ambrose et al., 2010; Joshi & Campbell, 2003). Relational governance offers such flexibility for the buyer; it signals that the supplier aims to understand and endorses (changing) buyer interests (Wei & Wang; 2007). Relational governance is thus an effective tool for buyers as they encounter changing requirements (Joshi & Campbell, 2003; Eisenhardt & Schoonhoven, 1996; Jap, 1999; Klein et al., 1990; Uzzi, 1997). As a safeguard to changing requirements, buyers will therefore pursue relational governance within the relationship with important suppliers. Suppliers will be more receptive to relational governance as buyer power is higher because under such circumstances they view buyer requests as more legitimate, are more likely to meet these requests, and may even pro-actively try to accommodate the buyer (e.g. Rezabakhsh et al., 2006). Therefore, I expect that as buyers have more power, levels of relational governance will be higher. Supplier performance will in turn increase as relational governance is positively associated with customer-based assessments of supplier performance in

various industrial settings (Artz, 1999; Bello et al., 2003; Cannon et al., 2000; Ferguson et al., 2005). In sum, I expect that:

H2a: As buyers have more power, relational governance is higher.

H2b: As relational governance is higher, supplier performance is higher.

H2c: The effect of buyer power on supplier performance is mediated by relational governance.

Suppliers generally have a higher need for transactional governance than buyers (Ferguson et al., 2005). Suppliers prefer to diminish unpredictability within the relationship by committing the buyer and communicating component requirements as early and clearly as possible (Ambrose et al., 2010). Suppliers thus want to put agreements into contracts to secure orders and hedge against any further requirements that buyers might develop (Wilson & Vlosky, 1998). By implementing detailed contracts, suppliers reap efficiency benefits that are associated with transactional governance, while buyers are burdened with a lack of flexibility (Bowen & Jones, 1986; Bradach & Eccles, 1989; Heide & John, 1990; Zenger et al., 2002). Suppliers may have a second reason why they prefer more contractualization. As a supplier has more power, buyer requests lose legitimacy in the eyes of the supplier (e.g. Rezabakhsh et al., 2006). Because a weaker buyer is not getting his needs met by the powerful supplier, the buyer will keep voicing his interest and approach the supplier with what the supplier regards as illegitimate requests (Oosterhuis et al., 2011). When the supplier does not meet these requests, it becomes apparent that firms have conflicting goals within the relationship. In order to shield his organization from further conflict, a powerful supplier may prefer an arm's length approach to his buyer-relations and set clear boundaries through detailed contracts (Gundlach & Achrol, 1993; Joshi & Arnold, 1998; Lusch & Brown, 1996). Although buyers prefer relational governance due to its flexibility, weaker buyers might also want to increase contracting levels to pursue their self-interest as they are not getting their needs met on a relational basis (e.g. Ferguson et al., 2005). Not surprisingly, transactional governance is usually associated with decreased supplier performance as perceived by the buyer (e.g. Cannon et al., 2000; Ferguson et al., 2005; Lusch & Brown, 1996; Uzzi, 1999). As laid out by Ferguson et al. (2005) for the bank industry in which banks are very powerful while customers lack power, transactional governance emphasizes short-term and opportunistic behavior by the bank which is not

compatible with the development of a positive client-based performance evaluation. In sum, I expect that:

H3a: As buyers have more power, transactional governance is lower.

H3b: As transactional governance is lower, supplier performance is higher.

H3c: The effect of buyer power on supplier performance is mediated by transactional governance.

The full model of this study is shown in Figure 2.2.

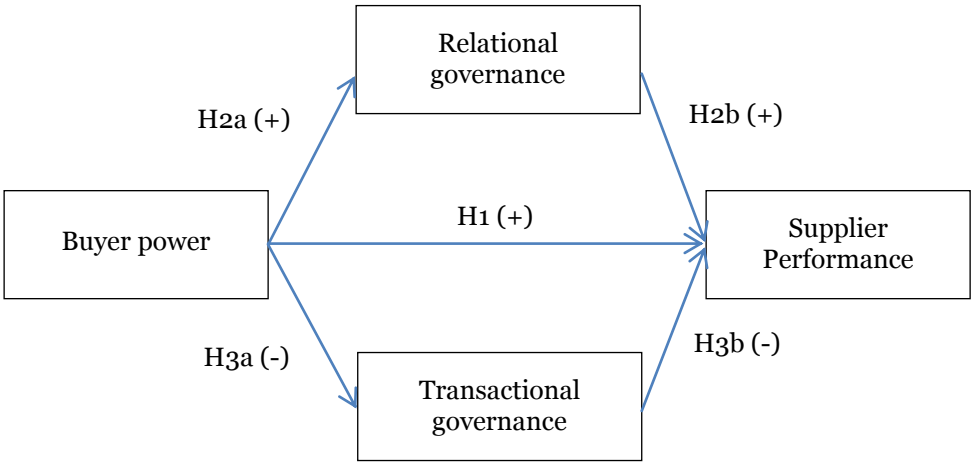

Figure 2.2: Theoretical model

METHODOLOGY

Data

To test the hypotheses, I employed a multi-method approach and combined qualitative insights from a narrative case study with quantitative analyses (i.e. a survey). An important advantage of this multi-method approach is that "it provides a means to confirm or disconfirm, cross-validate or reject, and corroborate or contradict evidence from multiple angles, thus enhancing theoretical potency" (Navis & Glynn, 2010). While the hypotheses are primarily tested through the survey, ex ante the case study narratively illustrates and explores how power, governance and supplier performance relate to each other, and ex post allows for the interpretation of statistical relationships, the

clarification of puzzling findings, and the identification of future research directions (Jick, 1979).

Survey. I conducted a survey among Dutch firms in the discrete manufacturing industries with more than 50 employees (Dutch Chamber of Commerce BIK codes 28-35; 28 Metal parts and products; 29 Machines and Equipment; 30 Office Equipment and Computers; 31 Other Electronic Machines, Devices and Appliances; 32 Audio-, Video- and Telecommunication- Devices and Appliances; 33 Medical Devices and Instruments; 34 Cars and Trailers; 35 Transportation means other than cars). Approximately 700 firms formed the target population. Respondents were approached by telephone. If the manager in charge of supply chain relations agreed to participate, a link to a website was sent to them where they could fill in the questionnaire online.

In order to keep the supply chain relationships comparable, I asked respondents at the buyer to fill in the survey for their fourth largest supply relationship in terms of revenue. Compared to the largest supplier, the choice for the fourth largest supplier controls for the potentially confounding effects on governance and supplier performance caused by the importance of a supplier and by the number of purchases at the supplier, and it diminishes social desirability bias (e.g. Anderson & Narus, 1990; Zaheer et al., 1998). I collected 125 completed questionnaires (i.e. the response rate was 18 percent). Typical respondents were male; only two respondents were female. On average, firms had 168 employees and an annual revenue of 51M euro. Most suppliers were located in Europe: The Netherlands (56%), Germany (14.4%), and other European countries (17.6%). The average buyer-supplier relationship length was 13.8 years.

Firms who did not agree to participate in the survey stated that this was due to a lack of time or a firm policy not to engage in surveys. To test for non-response bias, I performed tests to compare early and late responses based on the assumption that late responses are likely to be similar to non-responses (Armstrong & Overton, 1977). T-tests on the key variables of the model did not show any significant differences between the respondents that replied immediately and those that had to be reminded by a follow-up email and a telephone call. Furthermore, there was no significant difference in the relationship length, the annual revenue, and the number of employees between the early and late respondents. Non-response bias therefore seemed unlikely in this study.

Case study. I conducted an embedded case study of a large NASDAQ listed U.S. headquartered multinational in the high-end electronics sector and his key suppliers. This firm has strong ties to the Netherlands as it used to be part of a major Dutch firm. It still has an important location in The Netherlands where all supply decisions for the firm are made.

I focused on the ten largest supply relationships of this buyer in terms of purchasing spent. The choice for large supply relationships assures that the sum of money transferred in the relationship is large enough so that both the buyer and the suppliers care sufficiently about the relationship to actively use their power to pursue their interest. This allows for the effects of power to be clearly observed.

To create a range of power conditions, two senior managers in charge of supplier relations at the buyer scored and discussed the resource dependences in their key supplier relationships (based on the four items used to measure resource dependence; see Measures section). Four suppliers emerged as the best candidates for further study: supplier 2 (power advantage for buyer), supplier 9 (power advantage for supplier), and supplier 1 and 4 (power balance; I will explain later on why I selected two suppliers for power balance instead of just one supplier) (see Figure 2.3).

Data was gathered according to a case study protocol. I conducted face-to-face interviews with the key persons who shaped the supply chain relations at the buying firm and the supplying firms. In total, I conducted ten interviews at the suppliers and ten interviews at the buying firm. The main respondents at the buyer were two senior managers (both of them well familiar with all supplier relations, and each of them in charge of specific supplier relations). The main respondents at the supplier's side were the account managers responsible for the relations with the buyer. Secondary respondents at the buyer and supplier were other managers and more operational staff, who also had contacts with the respective other party. The interviews took place at firm locations in the USA (supplier 1 and 9), UK (supplier 2), Germany (supplier 4) and The Netherlands (buyer and supplier 1). I used the same questionnaire as in the survey, and asked the managers to qualitatively elaborate on their answers to each question.

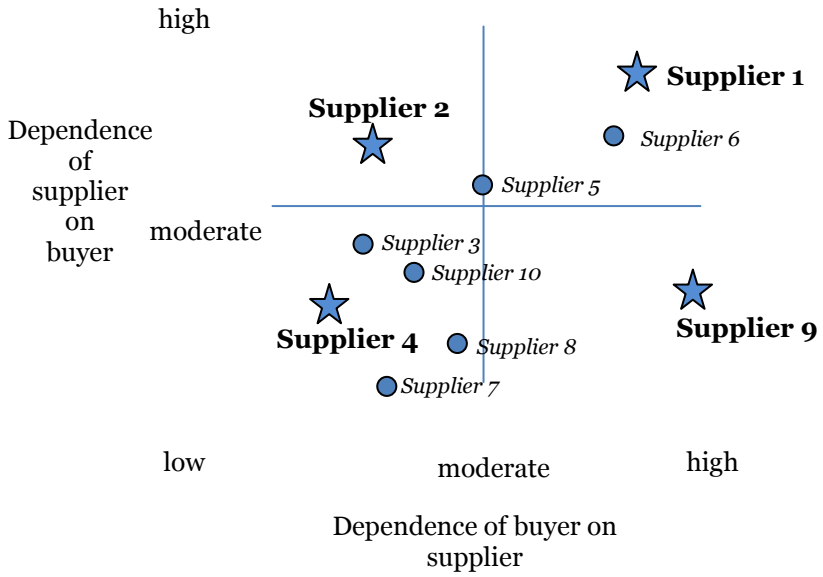

Figure 2.3: Resource dependences between the buyer and his top 10 suppliers (1=low, 3=moderate, 5=high).

Measures

Content validity of the measures was achieved through a comprehensive review of literature to distill initial items, and the involvement of practitioners and researchers to further refine them. Five academics from different disciplines in business and economics reviewed the items. Based on their comments, the scales were improved to achieve better concepts. For example, the dependence scales of Gulati and Sytch (2007) were adapted to achieve symmetry in the item content for the buyer and the supplier. During the case study data gathering, practitioners commented on the appropriateness of the research constructs and items. The practitioners considered the constructs complete which indicated content validity. One particular item ('I swim or sink together') which was designed to measure relational governance confused practitioners. Therefore this item was dropped in the survey analyses. The Appendix provides an overview of the scales (questions, items, and answer categories) and the studies from which these scales were adapted.

Resource dependence and power

The measures for resource dependence were based on Gulati and Sytch (2007) to reflect the number of alternative partners on the short and on the long term (Brass, 1984; Burt,

1982; Kumar et al., 1995; Kumar et al., 1998), the costs of switching to an alternative partner (Heide & John, 1988), and the extent of potential disruptions in production or sales if a switch would occur (e.g. El-Ansary & Stern, 1972; Pfeffer, 1972; Pfeffer & Salancik, 1978; Pugh et al., 1969). After reverse-scaling of negatively formulated items, an average was calculated to construct buyer dependence and supplier dependence. In correspondence with prior studies buyer power was calculated by subtracting the resource dependence of the buyer from the resource dependence of the supplier (Casciaro & Piskorski, 2005; Gulati & Sytch, 2007; Piskorski & Casciaro, 2006).

Relational and transactional governance

Although researchers agree about the general idea behind the governance modes, the operationalization of the modes varies across papers.

Consistent with a wide range of studies, in the current study relational governance was constructed to reflect several relational aspects: benevolence (a.k.a. extended assistence or relational flexibility, e.g. Ferguson et al., 2005; Lusch & Brown, 1996; Noordewier et al., 1990; Patnayakuni et al., 2006; Poppo & Zenger, 2002; Stephen & Coote, 2007), the pursuit of common goals (a.k.a. solidarity, e.g. Ferguson et al., 2005; Poppo & Zenger, 2002; Stephen & Coote, 2007), and joint evaluation (a.k.a. monitoring of supplier or joint performance improvement, e.g. Ferguson et al., 2005; Noordewier et al., 1990).

In line with literature, transactional governance was constructed to reflect the formalization of the relationship through explicit contracting (a.k.a. contractual complexity, e.g. Ferguson et al., 2005; Lusch & Brown, 1996) and the existence of conflicting goals (Ferguson et al., 2005; Stevens et al., 2012).

Supplier performance

The supplier performance measures were constructed to reflect "an encompassing view related to the profitability engendered from creating value in the eyes of the customer" (Ferguson et al., 2005; Grönroos, 1992; Reichheld, 1993). As advocated by various authors, different performance aspects of the buyer-supplier relationship were incorporated to capture supplier performance (e.g. Bello et al., 2003; Cannon et al., 2000; Hayes & Wheelwright, 1984; Leong et al., 1990; Noordewier et al., 1990; Paulin et al., 1997; Sirdeshmukh et al., 2002; Slack & Lewis, 2002). Similar to for example Gulati and Sytch (2007) and Paulraj and Chen (2007), the supplier performance items reflect

price, delivery dependability, responsiveness, flexibility, service and support, component quality and innovativeness.

As it has been argued that the effects of power manifest through repeated interaction over a period of time (Gulati & Sytch, 2007), I investigated how supplier performance has changed over the last three years of the buyer-supplier relationship. Supplier performance relative to past supplier performance is a widely applied measure in research on buyer-supplier relationships (e.g. Carr & Smeltzer, 1999; Chen et al., 2004; Frohlich & Westbrook, 2001; Jayaram et al., 1999; Kathuria, 2000; Vereecke & Muylle, 2006).

Measurement model

Validation of constructs

Using the survey data, Exploratory Factor Analyses (EFA) were performed in SPSS. To form factors, I used the principal component method with Varimax rotation. The number of factors extracted was based on theoretical considerations, the scree plot, and eigenvalues higher than one. Table 2.1 shows the final solution.

The resource dependence items loaded on the two expected factors: buyer dependence (BD) and supplier dependence (SD). There were no significant cross-loadings and the variance explained was 62.0 percent. Cronbach's alpha was .79 for BD and .77 for SD which compares favorably to prior studies (e.g. Gulati & Sytch, 2007). Power (P) was calculated from the dependence scales as described in the Measures section.

The governance items formed three instead of the two expected factors. The items for Relational governance loaded on the intended factor. The items for transactional governance split in two factors: conflict and contracts. After removal of two items with insufficient loadings, there were no cross-loadings between the three factors. The variance explained was 54.0 percent. Cronbach's alpha was .83 for relational governance, .64 for transactional-conflict governance and .71 for transactional-contract governance.

The items for supplier performance (SP) produced a satisfactory one-dimensional solution yielding a Cronbach's alpha of .85. Although overall the items fitted well together, the correlations between items that indicated the same supplier performance aspect (e.g. flexibility: component volume flexibility, component mix flexibility) was higher than the correlations between items of different supplier performance aspects

(e.g. quality versus flexibility). As such, the variance explained for the aggregate supplier performance construct was somewhat low (38.1 percent).

Descriptives of and Pearson correlations between the main concepts are shown in Table 2.2. Several observations can be made. First, the links between power and governance are as expected. Buyer power is significantly negatively correlated to transactional-conflict governance ($r = -.22$, $p < .01$) and transactional-contract governance ($r = -.19$, $p < .05$). Buyer power is positively yet not significantly correlated with relational governance ($r = .13$, n.s.).

Second, relational governance and transactional-conflict governance are significantly negatively correlated ($r = -.17$, $p < .05$). Yet, relational governance and transactional-contract governance are not significantly correlated ($r = .03$, n.s.). A paired-sample t-test pointed out that relational governance was utilized more than transactional-conflict governance ($t = 12.56$; $p < .01$) and transactional-contract governance ($t = 6.15$; $p < .01$).

Third, as anticipated, supplier performance was significantly positively correlated to relational governance ($r = .49$; $p < .01$) and significantly negative correlated to transactional-conflict governance ($r = -.20$, $p < .01$). Yet, there was no significant correlation between supplier performance and transactional-contract governance ($r = -.10$, n.s.). In line with expectations, supplier performance was also significantly positively correlated to buyer power ($r = .18$, $p < .05$)

Common method variance

Common method variance is a concern when single respondents are used for data collection. There are ex ante and ex post ways to deal with this concern (Podsakoff et al., 2003). Ex ante, I made sure that the respondents whom I asked were knowledgeable, I guaranteed them complete anonymity, and asked them to answer questions as best as they can or alternatively leave the question blank (Dillman, 2000). I used negatively and positively formulated items and made sure that there was sufficient variation in the sequence of the items. Moreover, respondents could not be guided by the model which I were looking to test. This model is complex and the questionnaire also included items which were used for other studies. Ex post, I statistically assessed common method bias (CMB) through the Harmon's single factor test for the EFAs. In the factor analyses which contained multiple constructs, the single unrotated factors explained less than 50 percent of variation and this indicates that CMB is not a major problem.

Table 2.1: EFA result for (a) Resource dependences (BD= Buyer dependence, SD = Supplier dependence) (b) Governance (Rel = Relational governance, TConflict = Transactional-conflict governance, TContract = Transactional-contract governance) (c) Supplier performance (SP). Factor loadings above .40 are shown.

Construct / Item	**Factor loadings**			
a) Dependences	*F1-BD*	*F2-SD*		
It would require much trouble and expense for us to switch to another supplier.	-.73			
For the components which we procure from this supplier, there are enough other potential suppliers to ensure adequate competition among the current suppliers.	.81			
There are satisfactory alternative sources of short-term supply available for these components.	.82			
We would face serious production problems if this supplier stopped supplying these components to us.	-.71			
If we withdrew our business from this supplier, it would require much trouble and expense for them to find other buyers.		.81		
For the components which we procure from this supplier, this supplier can find enough other potential buyers to get an adequate price.		-.81		
On the short-term, there are satisfactory alternative buyers available for this supplier's components.		-.60		
This supplier would face a serious financial crisis if we withdrew our business from them.		.78		
Initial Eigenvalue	*3.26*	*1.71*		
% of variance	*40.7%*	*21.3%*		
Cumulative % of variance	*40.7%*	*62.0%*		
(b) Governance	*F1-Rel*	*F2-TConflict*	*F3-TContract*	
We believe that this supplier would make sacrifices for us to support us.	.58			
This supplier can rely on us to help them in ways not required by their agreement with us.	.60			
We would make sacrifices for this supplier to support them.	.72			
This supplier and we want each other to succeed.	.61			
This supplier and we seek compatible goals.	.65			
When this supplier and we work together, we usually have common goals.	.63			

Our plant and this supplier evaluate our joint performance.	.69		
Our plant and this supplier regularly evaluate how good or bad we perform together.	.72		
When we do not perform well, we are jointly responsible.	.67		
This supplier and we have a win-lose relationship.		.78	
This supplier and we like to show that we are superior to each other.		.80	
This supplier's goals are incompatible with our goals.		.60	
We prefer to have everything spelt out in detail in the contract with this supplier.			.80
This supplier prefers to have everything spelt out in detail in the contract with us.			.83
Initial Eigenvalue	*4.12*	*1.98*	*1.47*
% of variance	*29.4%*	*14.1%*	*10.5%*
Cumulative % of variance	*29.4%*	*43.5%*	*54.0%*

(c) Supplier Performance (SP)	*F1-SP*
Price competitiveness	.65
Negotiated price versus target price	.48
Component quality	.50
Average defect rate	.57
Component customization ability	.50
Component innovation	.42
On-time delivery	.72
Delivery reliability / dependability	.71
Responsiveness	.77
Component volume flexibility	.63
Component mix flexibility	.64
Service and support	.71
Initial Eigenvalue	*4.57*
% of variance	*38.1%*

Table 2.2: Descriptives and correlations of the main variables (BP = Buyer Power, Rel = Relational governance, TConflict = Transactional-conflict governance, TContract = Transactional-contract governance, SP = Supplier performance).

Variables	N	Mean	SD	Min	Max	1	2	3	4	5
1. BP	125	0.01	1.00	-2.50	2.75	---				
2. Rel	125	3.41	0.54	1.89	4.89	.13	---			
3. TConflict	125	2.36	0.67	1.00	4.00	-.22**	-.17*	---		
4. TContract	124	2.88	0.82	1.00	4.50	-.19*	.03	.10	---	
5. SP	123	3.37	0.39	2.42	4.33	.18*	.49**	-.20*	-.10	---

* Significant at $p < .05$

** Significant at $p < .01$

Control variables

I followed the recommendations of Becker (2005) only to include control variables which have conceptually been argued and empirically been shown to affect the dependent variables. Variables that meet these standards may act as suppressors for the effects of the independent variable, and affect the (generalizability of the) results of the study. Therefore, such variables should be included in the models. However, if variables do not meet these criteria, they should be excluded from the models in order to reduce the possibility of Type II errors and a loss of power (Becker, 2005). Based on literature, I considered four control variables: total dependence, relationship length, industry, and firm size. For these variables, following the recommendations of Becker (2005), I will explain why I considered them to be relevant and assess whether they are correlated to the variables of interest (i.e. the dependent variable and the mediators).

Total dependence (i.e. the sum of resource dependences, e.g. Casciaro & Piskorski, 2005; Gulati & Sytch, 2007; Piskorski & Casciaro, 2006) is the second tenet of resource dependence theory. Total dependence reflects the total unique value created in the relationship. As total dependence is higher, transaction costs between firms are lower and there are increased opportunities for joint value creation (e.g. Casciaro & Piskorski, 2005; Gulati & Sytch, 2007; Piskorski & Casciaro, 2006). Supplier performance could thus be higher as total dependence is higher. Furthermore, total dependence may influence governance (e.g. Gulati & Sytch, 2007). When firms interact more due to higher opportunities for value creation and lower transaction costs, their understanding

for each other's interest may increase. Total dependence thus may promote convergent goals, mutually beneficial behavior and joint involvement, and foster cohesion, affective commitment, interactions that go well beyond contractual obligations between the firms, less conflict, less use of punitive actions and more use of relational tactics (French & Raven, 1968; Gulati & Sytch, 2007; Gundlach & Cadotte, 1994; Kumar et al., 1995; Lawler & Yoon, 1993; Lawler & Yoon, 1996; Lawler et al., 2000; Marsden, 1981; Mizruchi, 1989; Raven & Kruglanski, 1970; Turner et al., 1979; Uzzi, 1997). In short, higher total dependence may lead to higher relational governance and lower transactional governance. In the dataset, I found that total dependence was only significantly correlated to relational governance ($r = .27$, $p<.01$) but did not have a significant correlation with supplier performance ($r=-.03$, n.s.), transactional-conflict governance ($r=-.09$, n.s.) and transactional-contract governance ($r=.15$; n.s.). This would plea for inclusion of total dependence in the models where relational governance is tested as a mediator, and for exclusion of total dependence in all other models. Because total dependence is clearly an important control variable, I also opted for two cases of power balance in the case study: one case with low total dependence and one case with high total dependence.

Relationship length, industry and firm size are demographics which are commonly controlled for in supply chain literature (e.g. Oosterhuis et al., 2011; Oosterhuis et al., 2012; Rosenzweig et al., 2003). First, the relationship length might be linked to the type of governance and supplier performance; it is for example questionable whether relationships with high conflict and low supplier performance will be maintained over time. Similarly, relationships with high relational governance and high supplier performance may be more likely to survive the test of time. Second, the type of governance and supplier performance may differ per industry; e.g. the automobile industry has been reported to have especially averse supplier relations and suppliers being squeezed by buyers for higher supplier performance (i.e. low relational governance and high transactional governance; Mudambi & Helper, 1998). Third, the size of the buyer is reported to affect various firm performance measures and may thus also affect supplier performance (Rosenzweig et al., 2003). In order to test whether relationship length, industry and size should be included in the models, I first assessed the significance of the correlations between the controls and the variables that they might affect. Relationship length was not significantly correlated to relational governance ($r=-.12$, n.s.), transactional-conflict governance ($r=-.08$; n.s.), transactional-contract

governance (r=-.03; n.s.), and supplier performance (r=-.09; n.s.). Size (measured by the number of employees and by the annual sales of the plant) was not significantly correlated to supplier performance (r=.11, p=.25; r=.17, p=.10). I furthermore performed a MANOVA test of BIK-codes to assess if industry was significantly associated with the governance concepts and supplier performance. The MANOVA test indicated that there were no significant associations across these variables (F[32, 452]=0.932, p=.58). These results indicate that relationship length, industry, and size should not be included in the models.

Analysis

I tested the hypotheses through OLS regressions in SPSS. The control variable total dependence was included in the models concerning relational governance to assess the baseline condition. In all models, I added the respective main effect to test H1, H2a, H2b, H3a, and H3b. Mediation hypotheses H2c and H3c were tested through the method of Baron and Kenny (1986). For all tests, I deemed one-sided significance tests acceptable as I investigated the significance of a hypothesized weight.

NARRATIVE

Before presenting the survey results, ex ante, I narratively illustrate and explore how power, governance and supplier performance relate to each other through a case study. Some general characteristics of the four supplier relationships are shown in Table 2.3: size, innovativeness of products /components, resource dependence of the buyer, resource dependence of the supplier. First, with regards to size, it stands out that the buyer is relatively large (1000-2000 FTE) compared to his suppliers (<100 FTE). Supplier 2, 4 and 9 are part of large multinationals (>5000 FTE) but operate independently. Second, innovation of supplier components is important for the buyer. His own customers require the most innovative products and therefore he needs to incorporate innovative components into his products. In decreasing level of innovativeness, the supplier components were ordered as follows: supplier 9, supplier 1, supplier 2 and supplier 4. As I will describe, supplier 4 had started to develop innovative components for the buyer but these were not functioning optimally yet. Finally, it stands out that the more innovative the components of a supplier are and the better they fit the buyer's products, the higher the buyer's resource dependence.

Table 2.4 shows an overview of the main concepts in the supplier relationships. As expected, different levels of buyer power were observable across the relationships. In increasing order of buyer power the supplier relationships were: supplier 9 (power advantage supplier), supplier 1 (power balance), supplier 2 (power advantage buyer), 4 (large power advantage buyer although power balance was expected; see below). Suppliers 9, 1, and 2 confirmed both quantitatively and qualitatively that the power setting was as indicated by the buyer during the case selection (see Figure 2.3). During the interviews, both the respondents of the buyer and supplier 4 expressed that the resource dependences of both firms used to be low (see Figure 2.3), but that this was no longer the case. Over the last two years, the buyer had increased his spending at supplier 4 and had promised supplier 4 more business if he made substantial relation-specific investments in innovation. Supplier 4 indeed made considerable investments as he anticipated large benefits (i.e. increased revenue and better image) from delivering custom-made innovative components to the buyer. These components were not fully functioning yet and were not yet utilized on a large scale in the products of the buyer. As such, the supplier dependence on the buyer had vastly increased while the buyer dependence on the supplier had remained approximately equal. At the time of the interview, the buyer thus had a large power advantage over supplier 4, and thus supplier 4 actually should be positioned somewhere above supplier 2 in Figure 2.3.

As shown in Table 2.4, supplier performance, relational governance, and transactional governance vary across the supplier relationships. In Table 2.4, quotes were added as an illustration of the situation. In order of increasing supplier performance, increasing relational governance, and decreasing transactional governance, the supplier relationships are as follows: supplier 9, supplier 1, supplier 2, and supplier 4. I will discuss the links between the main constructs in the next paragraphs.

Table 2.3: General characteristics of the buyer and his supplier relationships

	Size of business unit (size of multinational in brackets)	**Innovativeness of buyer products / supplier components**	**Resource dependence of the buyer**	**Resource dependence of the supplier**
Buyer	1000-2000 FTE	Highly innovative, custom-assembled products. There is very infrequent innovation in the buyer's products. Innovation (and differentiation from competitors) is achieved by adding (unique) supplier components.	(not applicable)	(not applicable)
Supplier 9	<100 FTE (5000-10000 employees)	Highly innovative components essential to the functioning of the buyer's products	The technology of supplier 9 is patent protected, and his components are essential for the functioning of the products of the buyer. Alternative technologies / components are by far inferior. The resource dependence of the buyer on the supplier is thus very high.	If the buyer does not source the components of supplier 9, he cannot create a functioning product and fulfill the order. In that case, the buyer's competitors will receive the order and still source from the supplier. The supplier is quite indifferent to whom he supplies but he prefers stability on the buyer market. The resource dependence of supplier 9 on the buyer is therefore low to medium.
Supplier 1	<50 FTE	Very innovative components which serve as an important extra feature	The technology of supplier 1 is patent protected. Alternative technologies exist and are preferred by some end-consumers. The majority of end-consumers	The components of the supplier fit better with the products of the buyer than with the products of the buyer's competitors. The buyer

		for the products of the buyer	of the buyer opt for the components of supplier 1 as these fit the products of the buyer better than alternative components. As such, the resource dependence of the buyer on the supplier is high to very high.	recommends the components of supplier 1 to his end-consumers. The resource dependence of supplier 1 on the buyer is high to very high.
Supplier 2	<100 FTE (>10000 employees)	Various non-innovative generic components	Both firms used to be part of the same multinational until the late 1990s. The buyer used to source all generic components from supplier 2. Since the separation, the buyer has decreased the percentage spent at supplier 2 as alternative suppliers are able to provide better supplier performance. The current percentage spent at supplier 2 is expected to decrease further. Supplier 2 may be replaced completely. The resource dependence of the buyer on the supplier is thus low.	Over the past decade, supplier 2 has not developed new products or tried to increase their supplier performance in other areas. Due to historical ties, supplier 2 thought that the business of the buyer was safe. Supplier 2 has been substituting some of the business of the buyer with other buyers and has downsized his operations. The resource dependence of supplier 2 on the buyer is medium to high.
Supplier 4	<50 FTE (5000-10000 employees)	Both various non-innovative generic components, and very innovative custom-made components which serve as an important extra feature on the products of the buyer	There are a lot of alternative suppliers for the generic components. The custom-made innovative components may become very important for the buyer once they are fully functional. Through these components, he can differentiate himself from his competitors. While the components are not incorporated into a majority of products of the buyer, the resource dependence of the buyer on the supplier is low to medium.	Supplier 4 can substitute some of the generic components he currently sells to the buyer with business of other buyers. Yet, supplier 4 cannot leverage the custom made innovative components to other buyers. As such, the resource dependence of supplier 4 on the buyer is medium to high for the generic components, and very high for the innovative components.

Table 2.4: Overview of main concepts. The supplier relationships are sorted by increasing buyer power.

Relationship with	**Power**	**Supplier performance**	**Relational governance**	**Transactional governance**
Supplier 9	Power advantage supplier	Very low (--) "The price margins of supplier 9 are ridiculous! We asked repeatedly but they do not want to lower their prices." "We want them to deliver innovative components exclusively to us, but they are not willing to discuss this." (senior purchasing manager at the buyer)	Very low (--) "Both firms do not trust each other one bit." "We are trying to repair the relationship but it is difficult to convince both our own firm and supplier 9." (senior purchasing manager at the buyer) "The current purchasing managers of the buyer are nice people, but most others at the buyer do not mean our firm well." (account manager supplier 9)	Very high (++) "The previous purchasing manager was moved to another position, because he had caused so much conflict that we risked losing the supplier." (senior purchasing manager at the buyer) "The supplier performance which we deliver to the buyer is well specified in the contract. We are not interested in further collaboration with the buyer. Everything works well as it is." (account manager supplier 9)
Supplier 1	Power balance	Low (-) "The prices of supplier 1 are quite high." "Supplier 1 does not want to engage in exclusive innovation with us." (senior purchasing manager at the buyer)	Low (-) "We keep good contacts with the account manager, but the CEO of supplier 1 does not want to talk to our firm anymore." (senior purchasing manager at the buyer)	Medium to high (+/- to +) "Our firm is not interested in starting joint projects with the buyer." (account manager supplier 1) "We would be interested in exclusive innovation initiatives with this supplier, but they block everything. There was some conflict in the past about this which disgruntled their CEO." "Recently, our firm tried to take over supplier 1. The CEO of supplier 1 was very offended by the amount of money offered by our firm. He now

				communicates via his managers or via email, and avoids face-to-face contact with our firm." (senior purchasing manager at the buyer)
Supplier 2	Power advantage buyer	Not low, not high (+/-) "We have lowered our prices on request of the buyer to the absolute minimum. If we would further cut our prices, we would make a loss. If the buyer wants, he can look into our bookkeeping to see that we do not make excessive profits." (account manager supplier 2) "The supplier has lowered his prices but we want further price cuts. Compared to his competitors, supplier 2 still underperforms with regards to price and delivery dependability." (senior purchasing manager at the buyer)	High (+) "We try to accommodate the buyer wherever we can." (account manager supplier 2) "We have a good understanding with supplier 2. They are trustworthy." (senior purchasing manager at the buyer)	Low to medium (- to +/-) "We increasingly pressure supplier 2." "When we need better prices, we send the former purchasing manager to negotiate with supplier 2. He is a very tough negotiator." (senior purchasing manager at the buyer)
Supplier 4	Large power advantage buyer	High (+) "We have been adapting our products to accommodate changing specifications of the buyer." (account manager supplier 4)	Very high (++) "We work with supplier 4 on a basis of trust. Both firms will benefit from our joint innovation initiative in the future." (senior purchasing manager at the buyer)	Very low (--) "There is no contract that specifies which quantity [of the custom made innovative components] the buyer will purchase from us. But we would like such a contract at some point because the buyer has not been purchasing the promised amounts from us." (account manager supplier 4)

Overall, the case study is congruent with the reasoning developed in the theory section. First, as buyer power was higher, the supplier was more likely to adapt supplier performance to meet the buyer's requests. To illustrate this, I will summarize the supplier performance in the supplier relationships in order of increasing buyer power. In the relationship with the dominant supplier 9, it is practically impossible for the buyer to make any requests which lead to a favorable change in supplier performance. Although the buyer would like supplier 9 to reduce its prices and create innovative components especially for the buyer, the supplier has determined that these issues are off the table. Supplier 1, who is equally powerful as the buyer, is more willing to listen to buyer requests but is not interested in meeting most requests. He has declined to decrease his prices and to engage in exclusive innovation proposed by the buyer. On request of the buyer supplier 2, over whom the buyer has a power advantage, has considerably decreased his prices and is working on improving his delivery performance. Finally, supplier 4, over whom the buyer has a large power advantage, has accommodated many buyer requests. He has created innovative components especially for the buyer, he has adapted to changing buyer specifications regarding these innovative components, he sells these components to the buyer at a very low price, and has been very flexible regarding the numbers to be purchased by the buyer.

Second, in line with the reasoning in the theory section, the buyer and suppliers utilized different governance modes to meet their interest. As I will explain, relational governance was indeed preferred by this buyer to enhance supplier performance. However, somewhat departing from theory, yet in line with the results from the factor analyses in the measurement model section, the case study suggested that transactional governance has two separate components: conflict and contracts. Also, it indicated that only transactional conflict-governance has a negative effect on supplier performance. In the following paragraphs, I will outline the effects of power on the governance modes and supplier performance.

As buyer power was higher and suppliers were more willing to meet the buyer's requests, the buyer was able to accomplish more relational governance to achieve higher supplier performance. This is well visible in the relationship with supplier 4, where the buyer has a power advantage. In this relationship, the buyer has created goodwill with the supplier by increasing his spent. Furthermore, the buyer has repeatedly emphasized that both firms have common goals and will mutually benefit from joining forces in the innovation project. This has created a sense of importance and prioritization of buyer-specific innovation at supplier 4 and has affected supplier performance to the benefit of the buyer.

Yet, as buyer power was lower and suppliers were less inclined to engage in relational governance which promotes the realization of buyer requests, the buyer utilized transactional-conflict governance in an attempt to raise supplier performance. This approach was very unsuccessful with supplier 9 and supplier 1. The powerful supplier 9 threatened to terminate the supply of components to the buyer if the conflict would continue. Such a termination would have been very harmful to the buyer; without the components of supplier 9 the buyer would lose a substantial percentage of the orders from end-consumers. Similarly, transactional-conflict governance was not successful with supplier 1; this supplier became less responsive to buyer requests due to the conflict. At the time of the case study, the CEO of supplier 1 was not willing to personally listen to buyer requests anymore and sent a sales manager with limited decision power instead. In sum, although buyers with not much power may try to achieve higher supplier performance through transactional-conflict governance (because they cannot establish relational governance), it seems that raising conflict lowers supplier performance and this is not in the best interest of the buyer.

In the case study, suppliers preferred to utilize transactional-contract governance for various reasons. Supplier 4, who was less powerful, preferred more contractualization because this would commit the buyer to certain sales amounts for the innovative components. Yet, he could not enforce any contracts as he did not have sufficient power. On the other hand, the suppliers over whom the buyer did not have a power advantage (supplier 9 and 1) were able to enforce contracts. These suppliers used contracts to define what the buyer could and could not expect from them; these suppliers wanted to specify clearly which components they would deliver (instead of making changes to components if the buyer requested this) and which quantity they would deliver (instead of being flexible when the buyer wanted to purchase less components). For these suppliers, contracts lowered the conflict potential between firms and thus decreased the suppliers' costs of dealing with the buyer. For the same reason, supplier 9 and 1 generally formalized the relationship with the buyer. They strongly preferred to communicate through e-mail and to avoid face-to-face contact with the buyer as much as possible. Concluding, in the case study, contracts did not seem to have the purpose to keep supplier performance stable as there are changing requirements on the buyer's side. Overall, contracts did not seem to lower the supplier performance on average, but rather they were meant to lower the adaptability of the supplier to prevent dynamism at the buyer to spread to the supplier. Thus, as implied by the case study, it is possible that we will not find a direct

effect between contracts and supplier performance when testing our hypotheses through the survey.

In sum, as expected based on theory, the case study indicates that the higher the power of the buyer, the higher the supplier performance due to higher relational governance and lower transactional-conflict governance. Yet, while higher buyer power is associated with lower levels of contractualization, contracts may not affect supplier performance. This is summarized in Figure 2.4 (notice that there is no arrow between governance by contracts and supplier performance). The case study could indicate that the initial hypotheses that were derived from theory need to be revised somewhat. Yet, because the case study is not intended to be generalizable, in the next section I will test the initial hypotheses through a survey.

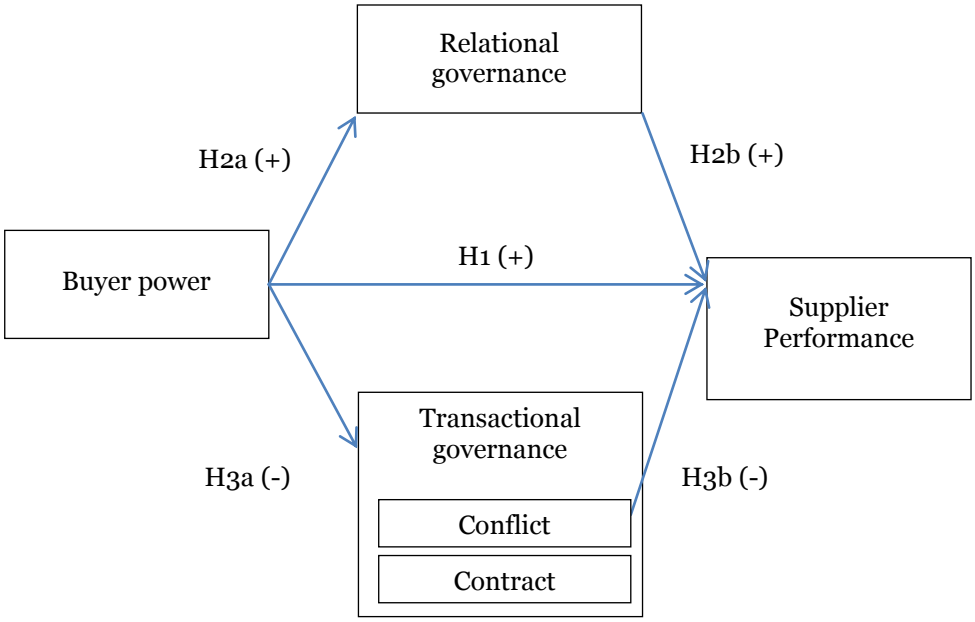

Figure 2.4: Indications from the case study.

RESULTS OF THE SURVEY

The results of the regressions are presented in Table 2.5 (a) and (b) and Table 2.6. H1 predicted a positive relationship between buyer power and supplier performance. As can be seen by comparing model 1 and 2 in Table 2.5 (a) and by assessing model 1 in Table 2.5 (b), the models with buyer power had significantly more predictive power (R-squared change = .03; $p < .05$); in line with the expectations the effect of buyer power on supplier performance was positive and significant ($b = .07$, $p < .05$). This result confirms H1.

H2a predicted a positive effect between buyer power and relational governance. As shown by the comparison between model 1 and 2 in Table 2.6, the model with buyer power (model 2) had significantly more predictive power than model 1 (R-squared change = .03; $p < .05$[3]); as predicted the effect of buyer power on relational governance was positive and significant ($b = .09$, $p < .05$). This result supports H2a.

H2b predicted a positive link between relational governance and supplier performance. As shown by the comparison between model 1 and 3 in Table 2.5 (a), the model with relational governance (model 3) had significantly more predictive power than model 1 (R-squared change = .27; $p < .01$). As predicted the effect of relational governance on supplier performance was positive and significant ($b = .39$, $p < .01$). This result supports H2b.

To assess the mediation predicted in H2c, model 4 was constructed (see Table 2.5 (a)). As shown by the comparison between model 2 and 4, the model with relational governance had significantly more predictive power than the model which contained only total dependence and buyer power (R-squared change = .24; $p < .01$). The effect of buyer power became insignificant when relational governance was added ($b = .03$, n.s.). This confirms mediation and supports H2c.

H3a predicted a negative link between buyer power and transactional governance. For transactional-conflict governance, as shown in Table 2.6, the model which contained buyer power (model 3) had significantly more predictive power than model 2 (R-squared change = .05; $p < .01$); as predicted the effect of buyer power on transactional governance was negative and significant ($b = -.15$, $p < .01$). As shown in Table 2.6 (model 4), the results for transactional-contract governance were similar (R-squared change = .04; $p < .05$; $b = -.16$, $p < .05$). These results support H3a.

[3] Because TD is a very poor predictor of relational governance (R-square: .00; n.s.), its presence diminishes the significance of our overall model. Nevertheless, due to the theoretical reasons laid out in the previous sections, we kept TD in our models despite the poor contribution. Yet, because of the low empirical contribution of TD, we assessed the R-square change of our main variable (i.e. buyer power) rather than the significance of the overall model. If we would leave TD out, the significance of the coefficients in our model does not change and the overall model is significant.

H3b predicted a negative link between transactional governance and supplier performance. As shown by Table 2.5 (b), the model with transactional-conflict governance (model 2) had significantly more predictive power (R-squared change = .04; $p < .01$); as predicted the effect of transactional-conflict governance was negative and significant ($b = -.12$, $p < .05$). This result supports H3b. Furthermore, the model with transactional-contract governance (model 4) did not have significantly more predictive power than the baseline model (R-squared change = .01; n.s.) and the effect of transactional-contract governance was negative yet insignificant ($b = -.05$, n.s.). This result does not support H3b. Combined, these results partially confirm H3b.

To assess the mediation predicted in H3c, models 3 and 5 were constructed (see Table 2.5 (b)). As shown by the comparison between model 1 and 3, the model with transactional-conflict governance had significantly more predictive power than the model which contained only buyer power (R-squared change = .03; $p < .05$). Furthermore, the effect of buyer power became insignificant when transactional-conflict governance was added ($b = .06$, n.s.). This result supports H3c. As shown by model 4 in Table 2.5 (b), transactional-contract governance is not a significant predictor for supplier performance. Therefore, transactional-contract governance could not serve as a mediator between buyer power and supplier performance. Model 5 in Table 2.5 (a) shows that this is indeed the case. Overall, H3c was thus partially supported.

Table 2.5 (a) and (b): Results of OLS regressions for Supplier performance

Table 2.5 (a): Models for Supplier Performance with the control variable Total Dependence (TD), Buyer Power (BP), and Relational governance (Rel)

Supplier performance

	Model 1		**Model 2**		**Model 3**		**Model 4**	
	Estimate	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*
Constant	3.42**	0.16	3.38**	0.16	2.33**	0.21	2.34**	0.21
TD	-0.01	0.03	0.00	0.03	-0.05*	0.02	-.004*	0.02
BP			0.07*	0.04			0.03	0.03
Rel					0.39**	0.06	0.38**	0.06
R-squared	.00		.03		.27**		.27**	
R-squared change	.00		.03[a]*		.27[a]**		.24[b]**	

** significant at p < .01

* significant at p < .05

[a] compared to model Model 1

[b] compared to model Model 2

Table 2.5 (b): Models for Supplier Performance with Buyer Power (BP), Transactional-conflict governance (TConflict) and Transactional-contract governance (TContract)

Supplier performance

	Model 1		**Model 2**		**Model 3**		**Model 4**		**Model 5**	
	Estimate	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*
Constant	3.37**	0.04	3.66**	0.13	3.61**	0.13	3.52**	0.13	3.47**	0.13
BP	0.07*	0.04			0.06	0.04			0.07*	0.04
TConflict			-0.12*	0.05	-0.10*	0.05				
TContract							-0.05	0.04	-0.03	0.05
R-squared	.03*		.04*		.06*		.01		.04	
R-squared change	.03*		.04*		.03[a]*		.01		.01[a]	

** significant at p < .01

* significant at p < .05

[a] compared to model Model 1

Table 2.6: Results of OLS regression for Relational governance (model 1 and 2), Transactional-conflict governance (model 3), and Transactional-contract governance (model 4) with Buyer Power (BP). Total Dependence (TD) is included as a control variable in the models for Relational governance.

	Relational governance				**Transactional-conflict governance**		**Transactional-contract governance**	
	Model 1		**Model 2**		**Model 3**		**Model 4**	
	Estimate	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*
Constant	2.80**	0.21	2.74**	0.21	2.37**	0.06	2.89**	0.07
TD	0.10**	0.03	0.11**	0.03				
BP			0.09*	0.05	-0.15**	0.06	-0.16*	0.07
R-squared	.07**		.10**		.05**		.04*	
R-squared change	.07**		.03*		.05**		.04*	

** significant at p < .01

* significant at p < .05

DISCUSSION

Based on a survey and illustrated by a case study, this study provided insights in how and why power in buyer-supplier dyads affects supplier performance. Adding to the insights from theory, ex ante the case study supported the two components of transactional governance found in the survey factor analyses. The case study pointed out that this particular buyer utilizes transactional-conflict governance to achieve higher supplier performance whenever he does not have sufficient power (i.e. whenever he has difficulty achieving higher supplier performance through relational governance). Furthermore, the case study indicated that transactional-contract governance was not meant to decrease supplier performance but to achieve clarity within the relationship in the investigated buyer-supplier relationships. As such, it pointed out that the mediation effect of power on supplier performance through transactional-contract governance may be absent.

In line with the theoretical expectations and insights from the case study, the survey findings demonstrated that as buyer power is higher, supplier performance is higher. The survey and case study indicated that this is due to the utilization of power: as buyer power is higher, relational governance is higher and transactional conflict-governance is lower. Higher relational governance and lower transactional conflict-governance are in turn linked to higher supplier performance. Levels of transactional contract-governance are lower as buyer power is higher, but this type of governance was not significantly linked to supplier performance (both in the survey and in the case study).

Theoretical and practical implications

This study has several implications for theory and practice. First, the finding that more powerful firms are able to shape supplier performance to their benefit, contributes to power literature and to practitioners' decision making. Classical power literature had thus far argued that the more powerful firm will initially be able to shape the relationship to his benefit (e.g. Emerson, 1962; Pfeffer & Salancik, 1978). Yet, it was assumed by some authors that under power imbalance this benefit will erode over time to a level where the power advantaged actor derives lower performance from the relationship than if there had been power balance (e.g. Gulati & Sytch, 2007). The study does not point to such effects; on the opposite, it seems that powerful buyers will keep benefiting from their power. In line with classical power literature and popular purchasing literature (Kraljic, 1983; Olsen & Ellram, 1997), the findings thus imply that buyers should seek to enhance their power in order to achieve higher supplier performance.

Second, the study shows that the effect of power on supplier performance is mediated by governance. In other words, this study indicates that power needs to be utilized in order to influence supplier performance. As such, the study also adds to the ongoing debate which governance modes can be distinguished and what purpose they serve. Approaching these issues from a power perspective, both the case study and survey indicate that three distinct governance modes can be distinguished (relational governance, transactional conflict-governance, and transactional contract-governance) and that these modes arise in buyer-supplier relationships for different (power related) reasons. I will address these reasons in the following two paragraphs.

For one, in line with prior studies, the case study suggests that as buyers have more power, they are able to enforce more relational governance to increase supplier performance. This is also supported by the survey findings. Yet, whenever buyers have less power and cannot implement relational governance because suppliers are less receptive to their requests, buyers may introduce conflict in the relationship in an attempt to achieve higher supplier performance. While the survey indeed indicates that as buyer power is lower, transactional-conflict governance is higher, it also shows that higher conflict is associated with lower supplier performance (similar to e.g. Oosterhuis et al., 2011; Stevens et al., 2012). As such, it seems that conflict is not in the best interest of buyers. In the case study, the buyer became aware of the negative effects of transactional-conflict governance and decreasingly utilized conflict in an attempt to enhance supplier performance. Overall, the study suggests that buyers who do not have sufficient power to achieve the supplier performance they desire, should attempt to enhance their power rather than create conflict with their suppliers. These results are in line with governance literature which generally prefers relational governance over transactional governance (Ferguson et al., 2005; Poppo & Zenger, 2002), but opposes traditional purchasing literature which promotes either a demanding and conflict-oriented approach of buyers to their supplier relations in cases when the buyer is powerful, or an avoidant approach whenever the buyer does not have much power (e.g. Gelderman & Van Weele, 2002; Kraljic, 1983; Olsen & Ellram, 1997).

Moreover, the survey showed that as buyer power decreases (and thus supplier power increases) the relationship is increasingly formalized through contracts in order to provide clarity about supplier performance. The case study indicated that suppliers generally prefer such clarity and that they are increasingly able to enforce it as their power increases. There is also an increased need for such clarity as supplier power increases; by formalizing the relationship the supplier may shield his organization from conflicts introduced by buyers who do not get their

needs fully met, and buyers may prefer contracts to be assured of critical supply. Because contracts do not seem to lower the supplier performance on average, but rather they lower the adaptability of the supplier to prevent changing requirements at the buyer to spread to the supplier, it is not surprising that the survey results did not show a significant negative link between contracts and supplier performance.

Limitations and directions for further research

The set-up of the study carries a few limitations. First, the cross-sectional design of the survey does not make it possible to prove causality. While in the research I argued that governance influences supplier performance, other authors have argued that the causality can be reversed. According to these authors, satisfaction about past supplier performance is an important basis for relational governance (Ganesan, 1994; Oosterhuis et al., 2011). Similarly, it is possible that whenever supplier performance is insufficient in the eyes of the buyer, he expresses his dissatisfaction and conflict thus arises. In the study, the case study complemented the survey to obtain insights regarding this causality. Nevertheless, I would advise future studies to conduct longitudinal, multi-method research to gain further insights into this issue. Yet, even with a different research design, it may be challenging to precisely establish to which degree governance is a subconscious psychological reaction to a certain power setting and the supplier performance which arises from it (a perspective preferred by psychology and sociology literature such as Dépret & Fiske, 1999; Fiske, 1993; Fiske et al., 2004; Kumar et al., 1995) or a deliberate and economically rational action meant to influence supplier performance in a certain power setting (a perspective preferred by corporate governance literature such as Ferguson et al., 2005; Poppo & Zenger, 2002).

Second, the survey was filled in by one respondent at the buyer which could introduce response bias (Oosterhuis et al., 2013). The case study was a valuable complement to the survey to gain insights if there was response bias and the extent to which this would influence the findings. For one, the case study indicated that buyers and suppliers are likely to respond differently. I found that respondents at the buyer side were generally more forthcoming about problems and points for improvement within the relationship. Respondents at suppliers were less inclined to acknowledge and address such issues. A reason for this might be that suppliers, being the delivering party, would have to solve most issues (e.g. improve delivery reliability, increase innovation, decrease price) while buyers, being the receiving party, would reap most of the benefits of the solution. As such, buyers and suppliers have different incentives regarding how to answer the questions regarding governance and supplier performance (also mentioned

by Oosterhuis et al., 2013). The survey results may thus be different if respondents at the supplier were asked. Furthermore, I found that the number of people which is informed enough to answer questions regarding supplier relations is very limited within firms. In the survey, I asked the main survey respondents if any of their colleagues could serve as a second respondent. The main respondents indicated that they were willing to provide contacts of colleagues but that in most cases no-one else was working intensively with suppliers. Other respondents would therefore only be able to answer very limited parts of the survey. In the case study, the answers of the main respondent were confirmed by the other respondents on those questions they could answer, given their knowledge of the situation. Therefore, in sum, I would suggest that future studies on buyer-supplier relationships capture both the perceptions of the most knowledgeable respondent at the buyer side and at the supplier side.

Third, Hypothesis 3c was supported which means that transactional-conflict governance mediates the relationship between the power of the buyer and the performance of the supplier. After entering transactional-conflict governance in the model (Table 5.2b model 3) the weight of the power of the buyer loses significance. However, by entering transactional-conflict governance in the model the weight of buyer power decreases only from 0.07 to 0.06. Therefore, it seems better to speak of partial mediation instead of full mediation. It would be beneficial if future research investigates further how exactly transactional-conflict governance mediates the relationship between buyer power and supplier performance.

Fourth, in the study I posed that firms utilize their power to influence supplier performance to their benefit. The study thus carries the premise that supply chain decision makers at firms strive to improve supplier performance to their firm's benefit. Leadership literature largely confirms this premise as it distinguishes three types of leaders within firms (Avolio, Bass, & Jung, 1999; Bass, 1993). First, 'transformational' leaders offer their followers a purpose that transcends short-term goals and focuses on higher order intrinsic needs. Under this type of leadership, relational governance could be established. Second and by contrast, 'transactional' leaders focus on the proper exchange of resources. Transactional leaders are prone to establish transactional-contract governance as they favor a clearly specified exchange of resources. Yet, leadership literature also identifies a third type of leadership style, namely non-leadership (a.k.a. laissez-faire leadership). Leaders with a laissez-faire leadership style avoid making decisions, hesitate in taking action, and are absent when needed. In the study, I did not take into account the presence of laissez-faire leadership and a consequent lack of utilization of power. The occurrence of this leadership style may partially account for the relatively low R-squared value when explaining supplier performance from power. I would recommend future studies on

power in supply chains to investigate how the leadership styles of decision makers affect buyer-supplier governance, and what the consequences are for supplier performance. Such research should also take into consideration how prone leaders are to creating conflict with others, and thus establish their tendency towards transactional-conflict governance.

Finally, contextual factors may influence the preference of managers for a certain governance mode. That context may be important becomes apparent if I compare the results of the study with the results of Gulati and Sytch (2007). While I found a linear and positive effect of buyer power on supplier performance, Gulati and Sytch (2007) found no effect when suppliers were power advantaged and a negative effect when buyers were power advantaged. This difference may be due to the fact that the study focused on multiple Dutch buyers operating in various industries. Gulati and Sytch (2007) investigated one U.S. based buyer. As I will explain next, there may thus be differences with regards to for example country and leadership style.

Regarding country specific effects, Hofstede (1980) showed that values and conduct in the workplace are strongly influenced by culture. Masculine cultures seem to have a natural preference for transactional-conflict governance as they value competitiveness, assertiveness, materialism, ambition and display of power. Feminine cultures on the other hand place more value on relational governance; relationships and quality of life are highly valued factors. The survey sample probably had a cultural bias as it focused on The Netherlands (a feminine culture). It is possible that the results would have been different for countries which are more masculine. Besides masculinity / femininity, other cultural dimensions such as individualism / collectivism and long term / short term orientation could also influence the preferred governance and thus the results. As the generalizability of the findings may be limited in different cultural settings, I would suggest that future research investigates the studied relationships in other cultural contexts.

Results may also change when the research framework is leveraged to other industries (e.g. the food industry, or industries that produce raw materials) than those included in the survey and case study. For example, the case study stipulated the importance of relational governance for buyers who need to innovate due to fierce competition. In industries where there is less pressure to innovate, buyers may have less reason to establish relational governance with suppliers. In such cases, decision makers at the buyer may prefer a laissez-faire approach to their supplier relations. An avenue for further research may be to investigate the role of innovation pressure on the preferred governance modes by buyers and suppliers and on the governance they pursue as they have more power.

Conclusion

Concluding, the study provided multiple new insights in the effects of power on buyer-supplier governance and supplier performance. I showed that buyer power has a linear, positive link with supplier performance. Furthermore the effect of buyer power on supplier performance is mediated by governance. As buyer power is higher, relational governance is higher and transactional conflict-governance is lower. I found that transactional contract-governance is lower as buyer power is higher but I did not find a link with supplier performance.

CHAPTER 3

How do power imbalance and total dependence affect investments in transaction specific assets?

INTRODUCTION

Organizational survival hinges on the ability of firms to obtain critical resources from the external environment (Emerson, 1962; Pfeffer & Salancik, 1978; Pfeffer & Salancik, 2003; Selznick, 1949). Not surprisingly, literature has devoted much attention to how firms deal with their dependence on the resources of others (e.g. Casciaro & Piskorski, 2005; Pfeffer & Salancik, 1978; Porter, 1980; Williamson, 1985). For one, there is a substantial body of literature which empirically describes that firms structurally and fully eliminate the resource dependences between firms by engaging in mergers and acquisitions (e.g. Casciaro & Piskorski, 2005; Chatterjee, 1986; Devos et al., 2009; Gaughan, 2007). Yet, there is little empirical evidence how firms that continue to operate in a certain resource dependence setting manage their relationship (Williamson, 2008).

Particularly little is known about how the resource dependence setting influences investments in transaction specific assets (TSAI) between buyers and suppliers. TSAI are an important way to improve the flow of materials in buyer-supplier dyads; TSAI can lead to benefits such as increased revenue through reduced resource uncertainty for buyer and supplier, enhanced supply chain responsiveness, and reduced transaction costs of producing and distributing a good or service (e.g. Maloni & Benton, 2000). The TSAI which I consider in this study are investments of the buyer and the supplier in their production systems and in the IT systems that support these production systems (e.g. Kulp et al., 2004; Ramdas & Spekman, 2000). These TSAI are especially important as they relate to production which is the core business of most manufacturing firms.

Building on resource dependence theory (RDT), in this study I theoretically propose that, and empirically test if, TSAI are driven by the resource dependence setting between buyers and suppliers. As I will explain further on, I expect that the two central tenets of RDT (power imbalance and total dependence, e.g. Casciaro & Piskorski, 2005; Gulati & Sytch, 2007; Pfeffer & Salancik, 1978) predict when TSAI occur. I expect that power imbalance is negatively associated with TSAI when total dependence is low, whereas power imbalance is positively associated with TSAI when total dependence is high. There is a power imbalance if one firm is

less dependent on the resources of the other firm than vice versa. Total dependence is the sum of resource dependences of the buyer and supplier.

Literature has strongly indicated that the extent to which the flow of materials in buyer-supplier dyads is improved is influenced by both central tenets of resource dependence theory (Pfeffer & Salancik, 1978; Pfeffer & Salancik, 2003). Yet, there are very few empirical insights regarding their combined effects (Casciaro & Piskorski, 2005). Based on early work on resource dependence one may expect that the relationship between power imbalance and the need to invest in buyer-supplier relationships may vary under different levels of total dependence (e.g. Emerson, 1962), but it has almost exclusively focused on the direct effects of power imbalance. Similarly, later studies have hinted that conditional on the level of total dependence, power imbalance can work as a barrier or as a driver for investing in relationships but they did not empirically test such effects (Mizruchi, 1989; e.g. Mizruchi, 1992; Provan & Gassenheimer, 1994).

More recently, Casciaro and Piskorski (2005) studied the effects of both RDT tenets on mergers and acquisitions (M&A). M&A remove organizational barriers between buyers and suppliers and enable an improved flow of materials due to full and centralized control over the flow of materials. As far as I am aware, no empirical work has been conducted to investigate how the RDT tenets affect improving the flow of materials by means of (production related) investments in transaction specific assets in supply chains. This is odd, because such investments in transaction specific assets have been acknowledged throughout literature as an important way to extract more value from buyer-supplier relationships (see Williamson, 2008, and literature on supply chain integration which also covers such investments between buyers and suppliers, e.g. Dyer, 1996; Frohlich & Westbrook, 2001; Maloni & Benton, 2000). As such, it would be interesting to both academics and practitioners to better understand the (resource dependence) setting under which TSAI are likely to occur (Casciaro & Piskorski, 2005, p.194). In this study, I contribute to theory and business practice by exploring the link between the two tenets of RDT and (production related) TSAI.

As laid out in more detail in the Theory section, I reason that depending on the level of total dependence, power imbalance can work as either a barrier or as a driver for investments in transaction specific assets. As the powerful firm has more power, he will be more able to meet his interest within the relationship (e.g. his interest for investments in transaction specific assets). I will argue that as the powerful firm is more powerful (i.e. as power imbalance is higher), he will have more interest to establish TSAI (by investing himself and by making the

less powerful firm invest) if total dependence is high, and he will have less interest to establish TSAI if total dependence is low.

The study makes both scientific and practical contributions. First, I aim to improve the understanding of researchers and practitioners under which circumstances production related TSAI are likely to occur. While there is abundant evidence present that investing in buyer-supplier relationships can help firms to stay competitive (e.g. Frohlich & Westbrook, 2001) and that higher total dependence facilitates investing in relationships (Helper & Sako, 1995; Uzzi, 1996; Uzzi & Gillespie, 2002), practitioners have also received normative recommendations to maintain distance to their partner and not to invest when they are power advantaged (Porter, 1980). As such, literature is contradicting and it is unclear under which circumstances practitioners invest in buyer-supplier relationships and when they remain at arm's length to their supply chain partners (and thus do not engage in such TSAI).

Second, by providing insights into the interaction effects of power imbalance and total dependence on TSAI, I empirically test the applicability of resource dependence theory to business practice. Such insights are necessary; while resource dependence theory is widely cited and generally considered to be a powerful inter-organizational metaphor, there is a limited amount of empirical work explicitly extending and testing the theory (Casciaro & Piskorski, 2005; Pfeffer & Salancik, 2003).

To test the hypotheses, I conduct a survey of buyer-supplier relations in the Dutch discrete manufacturing industries.

THEORETICAL FRAMEWORK

Investments in transaction specific assets

Investments in transaction specific assets between buyers and suppliers can be made in tangible assets, production practices and labor which jointly form their production systems (e.g. De Toni, 1999; Dong et al., 2001; Frohlich & Westbrook, 2001; Kulp et al., 2004), and in information systems which support these production systems (e.g. Bagchi et al., 2005; Frohlich & Westbrook, 2001; Kulp et al., 2004; Moberg et al., 2004; Ramdas & Spekman, 2000). Through such investments, firms aim to improve the flow of materials between themselves and their supply chain partner. As a result of this improved material flow, firms can derive benefits such as increased revenue through reduced resource uncertainty for buyer and supplier, enhanced supply chain responsiveness, and reduced transaction costs of producing and distributing a good or service (Maloni & Benton, 2000). These benefits manifest when both

buyers and suppliers jointly make an effort to improve the flow of materials and thus jointly invest in the relationship (Dyer, 1996; Frohlich & Westbrook, 2001).

While TSAI between a buyer and a supplier may contribute to improving the flow of materials in their dyad, they may also have significant disadvantages. First, it is costly to make TSAI. Second, once the TSAI are made, none of the costs can be retrieved by leveraging them to another supply chain relationship. A termination of the relationship would thus mean that these investments are lost (Klein et al., 1978). Third, and perhaps most importantly, as emphasized by various authors, TSAI increases total dependence and this weakens the bargaining position of the powerful (Casciaro & Piskorski, 2005; Williamson, 1971; 1975; 1985; 2009; Klein et al. 1978). In the next section, I will explore particularly this third mechanism in more detail.

The central tenets of resource dependence theory and their effects on investments in transaction specific assets

According to resource dependence theory, resource dependence indicates the extent to which a firm needs to maintain the exchange of resources with its current partner (Pfeffer & Salancik, 1978). The focus of resource dependence theory is what Casciaro and Piskorski (2005) refer to as ex-ante dependence; this dependence exists because firms face structural market restrictions regarding the parties with which they can exchange resources. However, as pointed out by Casciaro and Piskorski (2005), there is also ex-post dependence. This dependence arises when, as laid out by transaction cost theory (Williamson, 1975), firms invest in transaction-specific assets (i.e. when firms engage in TSAI). In contrast with resource dependence theory which emphasizes structural market restrictions, transaction cost economics assumes that two parties are initially independent and develop dependence over time as they invest in their relationship.

Both theories are complementary to each other: ex-ante dependence due to structural market restrictions is likely to affect the extent to which firms invest in their relationship and any additional ex-post dependence that may arise from such investments (Casciaro & Piskorski, 2005). To predict how the ex-ante resource dependence setting in which firms operate influences buyer-supplier exchanges, authors strongly build on the two central tenets of resource dependence theory (Pfeffer & Salancik, 1978): power imbalance and total dependence (e.g. Casciaro & Piskorski, 2005; Gulati & Sytch, 2007). In line with literature, I will argue that each of the two tenets has a different direct effect on TSAI, but more importantly, that an interaction effect can be expected (i.e. the effect of power imbalance on TSAI is conditional on total dependence).

Power imbalance is the dependence asymmetry between a buying and supplying firm (Gulati & Sytch, 2007; Kumar et al., 1995; Pfeffer & Salancik, 1978; Piskorski & Casciaro, 2006). If the dependence of one firm on the other firm is lower than vice versa, then there is a power imbalance. This means that if the first firm has a power advantage, the second firm by definition has a power disadvantage. Because the less dependent actor can more credibly threaten the more dependent actor by leaving the exchange than vice versa, he has a better bargaining position. Thus, he will dominate the exchange and will have more influence on the conditions of the relationship (Burt, 1983; Emerson, 1962; Friedkin, 1986; Lawler & Bacharach, 1987; Pfeffer & Salancik, 1978; Pfeffer & Leong, 1977; Piskorski & Casciaro, 2006; Porter, 1980; Provan et al., 1980; Ven et al., 1976). The more dependent firm will accept this inequality because he will face greater resource uncertainty and worse exchange conditions than vice versa should the exchange of resources fail (Piskorski & Casciaro, 2006).

Several authors have indicated that the effect of power imbalance on investing in buyer-supplier relationships is moderated by the level of total dependence (i.e. the sum of resource dependences) (e.g. Casciaro & Piskorski, 2005; Emerson, 1962; Gulati & Sytch, 2007; Mizruchi, 1989; Mizruchi, 1992; Provan & Gassenheimer, 1994). These authors have argued that not only the ability of the powerful firm to pursue his interest should be taken into consideration when explaining investments in the relationship; the actual interest of the powerful firm to engage in such investments also matters.

Literature has indicated that the powerful firm has a great interest to attribute as much value to himself as possible (e.g. Emerson, 1962; Piskorski & Casciaro, 2006). In order to do so, the powerful firm may enforce TSAI within the dyad to improve the flow of materials. As the powerful firm has the strongest bargaining position, he will attribute the most value from such investments to himself. Yet, the powerful firm also has an interest to protect his strong bargaining position within the dyad. Due to this bargaining position, he will be able to continue attributing more value to himself in the future (e.g. Porter, 1980). Several authors have indicated that this bargaining position may be in jeopardy whenever firms tighten the relationship with the weaker firm by investing in it (e.g. Mudambi & Helper, 1998). If one firm would make TSAI, the relationship with the other firm would become more attractive to him compared to relationships with other firms, and thus he would become more dependent on the other firm. The relationship may also become more attractive to the other firm as the first firm has additional value to offer to the second firm compared to the first firm's competitors. As the relationship becomes more attractive for both firms, they are both increasingly committed

(a.k.a. locked-in) to the relationship. In this case, especially the bargaining position of the powerful firm is jeopardized as his threat to abandon the relationship diminishes.

In sum, powerful firms can gain value by tightening the relationship through TSAI but they can also lose value through TSAI. The question arises: when is it in the interest of the powerful firm to promote TSAI within the dyad, and when is it in the interest of the powerful firm to deter such TSAI? I will argue that the answer to this question lies in the level of total dependence.

There are several reasons why the powerful firm has more interest to exercise his power to achieve TSAI within the dyad when total dependence is higher. First, when total dependence is higher, there is more value being created within the relationship (i.e. for both firms individually and for the dyad as a whole[4]). Investing in the relationship makes sense for both firms (and especially for the powerful firm as he can attribute more value to himself) as there is more additional value to be gained; when significant additional value can be created through investments, this value is likely to weigh against the investment costs. Second, the likelihood that firms exit the relationship is lower. As such, the chance that the investment costs cannot be retrieved within the duration of the relationship is lower. But more importantly perhaps, the bargaining position of the power advantaged firm is less strong under high total dependence. As total dependence is higher, the dependences of both firms are higher, and both firms are progressively 'hostages' of their relationship (e.g. Casciaro & Piskorski, 2005; Gulati & Sytch, 2007). Therefore, if total dependence is high, the powerful firm may be better off reaping the benefits of TSAI although these would further diminish his bargaining position (as they would further suck both parties into the relationship and thus increase total dependence). Third, when total dependence is high, the powerful firm may be more aware of opportunities to improve the flow of materials. Psychology literature has indicated that total dependence increases cohesiveness between firms and the amount of interaction between them. Under such conditions, more value can be created due to a higher understanding of each other's interests, more cooperation and more mutually beneficial behavior (Gulati & Gargiulo, 1999; Lawler & Yoon, 1996; Lawler et al., 2000; Marsden, 1981; Provan, 1993; Uzzi, 1997). As the powerful is more aware of such opportunities for value creation (i.e. as he is more aware of how he can pursue his interest in the relationship), he is more likely to exercise his power.

Yet, when total dependence is low, particularly the powerful firm has low motivation to improve the flow of materials. In that case, the powerful firm would erode his bargaining

[4] As total dependence is higher, the dependences of both firms are higher when we control for power imbalance (also see Casciaro and Piskorski, 2005). Higher dependences signal more value being created for each firm within the dyad, and higher total dependence signals higher value being created within the dyad as a whole.

position by promoting TSAI (which make it more difficult for him to leave the relationship), the costs of investments would be less likely to be retrieved within the duration of the relationship, and the powerful firm might not even be aware of opportunities for value creation (e.g. Dépret & Fiske, 1999; Fiske, 1993; Fiske et al., 2004). Therefore, when total dependence is low, the powerful firm likely will opt to remain at a distance in order to fully exploit his strong bargaining position (Casciaro & Piskorski, 2005). I thus expect that:

H1: Total dependence moderates the relationship between power imbalance and investments in transaction specific assets: this relationship will be negative if total dependence is low and positive if total dependence is high.

METHODOLOGY

Data

To test the hypotheses I conducted a survey among Dutch firms in the discrete manufacturing industries with more than 50 employees (Dutch Chamber of Commerce BIK codes 28 - 35; 28 Metal parts and products; 29 Machines and Equipment; 30 Office Equipment and Computers; 31 Other Electronic Machines, Devices and Appliances; 32 Audio-, Video- and Telecommunication- Devices and Appliances; 33 Medical Devices and Instruments; 34 Cars and Trailers; 35 Transportation means other than cars). Approximately 700 firms formed the target population. Respondents were approached by telephone. If the manager in charge of supply chain relations agreed to participate, a link to a website was sent to them where they could fill in the questionnaire online. In order to keep the supply chain relationships comparable, I asked respondents at the buyer to fill in the survey for their fourth largest supply relationship in terms of revenue. Compared to the largest supplier, the choice for the fourth largest supplier controls for the potentially confounding effects on TSAI caused by the importance of a supplier and by the amount of purchases at the supplier, and it diminishes social desirability bias (e.g. Anderson & Narus, 1990; Zaheer et al., 1998). I collected 125 completed questionnaires (i.e. the response rate was 18 percent). Firms who did not agree to participate in the questionnaire stated that this was due to a lack of time or a firm policy not to engage in surveys.

Measures

Content validity was achieved through a comprehensive review of literature to distill initial items, and the involvement of practitioners and researchers to further refine them. First, five academics from different disciplines in business and economics reviewed the items. Based on

their comments, ambiguous items were rephrased. No items were removed or added. Next, twelve supply chain practitioners commented on the appropriateness of the research constructs and items. No items that were ambiguous or inappropriate were identified. Furthermore, the practitioners deemed the constructs to be completely covered by the items. The questions, items, and answer categories of all scales are provided in the Appendix.

Investments in transaction specific assets

As far as I am aware, no established scales exists which cover multiple-facets of production related investments in transaction specific assets by buyers and suppliers. Frequently, supply chain literature treats such investments in transaction specific assets in production as a part of 'integration' between buyers and suppliers. As such, investments in transaction specific assets are part of broader scales intended to measure other aspects of integration such as interaction patterns and attitudes between buyers and suppliers (Van der Vaart & Van Donk, 2008). Because the measures of supply chain integration are broader than just investments, literature frequently incorporates only some investments that can be made in the production systems of the buyer and supplier. To construct a well-rounded measure of investments in transaction specific assets in production, based on the literature described in the Theory section and by reviewing the papers used in the literature review of Van der Vaart and Van Donk (2008), I constructed multiple items to reflect the investments that buyers and suppliers can make in production practices, production assets, and labor, and IT systems which support their production systems (see Appendix).

Resource dependence and derived tenets

The measures for resource dependence were based on Gulati and Sytch (2007) to reflect the number of alternative partners on the short and on the long term (Brass, 1984; Burt, 1982; Kumar et al., 1995; Kumar et al., 1998), the costs of switching to an alternative partner (Heide & John, 1988), and the extent of potential disruptions in production or sales if a switch would occur (e.g. El-Ansary & Stern, 1972; Pfeffer, 1972; Pfeffer & Salancik, 1978; Pugh et al., 1969). After reverse-scaling of negatively formulated items, an average was calculated to construct buyer dependence and supplier dependence. From these dependences, power imbalance and total dependence were constructed (see also Caskiaro & Piskorski, 2005; Gulati & Sytch, 2007; Piskorski & Casciaro, 2006). Power imbalance was calculated as the absolute difference between the buyer dependence and supplier dependence. As I used a 1 to 5 Likert scale, power imbalance

could range from 0 to 4. Total dependence was calculated by adding both dependences. Using the 1 to 5 Likert scale, total dependence could range from 2 to 10.

Measurement model

Validation of constructs

Using the survey data, Exploratory Factor Analyses (EFA) were performed in SPSS. To form factors, I used the principal component method with Varimax rotation. The number of factors extracted was based on theoretical considerations, the scree plot, and eigenvalues higher than one. Items were retained if they had high loadings on their own factor and low loadings on other factors (See Table 3.2).

The items loaded on the three expected factors: buyer dependence (DB), supplier dependence (DS), and investments in transaction specific assets (TSAI). There were no significant cross-loadings and all items were retained. The variance explained was 54.4 percent. Cronbach's alpha was .79 for DB and .77 for DS which compares favorably to prior studies (e.g. Gulati & Sytch, 2007). Cronbach's alpha was .90 for TSAI.

In Table 3.3 I show the descriptives of and correlations between the main variables investments in transaction specific assets (TSAI), power imbalance (PI) and total dependence (TD). Table 3.3 indicates that the level of investments in transaction specific assets is higher as total dependence is higher, and that the level of investments in transaction specific assets is lower as the power imbalance between firms is higher, yet this second effect is only marginally significant.

Table 3.2: EFA result (TSAI=Investments in transaction specific assets, BD=Buyer dependence, SD=Supplier dependence). Loadings with absolute values above .40 are shown.

Construct / Item	**Factor loadings**		
	F1-TSAI	*F2-BD*	*F3-SD*
TSAI by Buyer: Information systems (Hardware/software to improve your information sharing capability with this supplier)	.72		
TSAI by Buyer: Implementation of production practices (Pull system, Cellular manufacturing, Cycle time reduction, Bottleneck/constraint removal)	.69		
TSAI by Buyer: Training of existing personnel (production, R&D, etc)	.63		
TSAI by Buyer: Appointing new personnel (production, R&D, etc)	.60		

TSAI by Buyer: Equipment, machines and tools for production, packaging, storage, transportation	.68		
TSAI by Buyer: Facilities for production and storage (buildings and warehouses)	.54		
TSAI by Supplier: Information systems (Hardware/software to improve this supplier's information sharing capability with your plant)	.67		
TSAI by Supplier: Implementation of production practices (Pull system, Cellular manufacturing, Cycle time reduction, Bottleneck/constraint removal)	.72		
TSAI by Supplier: Training of existing personnel (production, R&D, etc)	.65		
TSAI by Supplier: Appointing new personnel (production, R&D, etc)	.69		
TSAI by Supplier: Equipment, machines and tools for production, packaging, storage, transportation	.73		
TSAI by Supplier: Facilities for production and storage (buildings and warehouses)	.67		
It would require much trouble and expense for us to switch to another supplier.		.67	
For the components which we procure from this supplier, there are enough other potential suppliers to ensure adequate competition among the current suppliers.		-.79	
There are satisfactory alternative sources of short-term supply available for these components.		-.79	
We would face serious production problems if this supplier stopped supplying these components to us.		.68	
If we withdrew our business from this supplier, it would require much trouble and expense for them to find other buyers.			.70
For the components which we procure from this supplier, this supplier can find enough other potential buyers to get an adequate price.			-.81
On the short-term, there are satisfactory alternative buyers available for this supplier's components.			-.62
This supplier would face a serious financial crisis if we withdrew our business from them.			.73
Initial Eigenvalue	*6.39*	*2.63*	*1.84*
% of variance	*32.0%*	*13.2%*	*9.2%*
Cumulative % of variance	*32.0%*	*45.1%*	*54.4%*

Table 3.3: Descriptives and correlations of our main variables (PI=Power imbalance, TD=Total dependence, TSAI=Investments in transaction specific assets)

Variables	Mean	SD	Min	Max	1	2	3
1. PI	0.78	0.61	0.00	2.75	---		
2. TD	6.05	1.41	3.00	9.25	-.10	---	
3. TSAI	2.04	0.70	1.00	3.83	-.16$	.32**	---

$ Significant at p < .10

* Significant at p < .05

** Significant at p < .01

Common method variance

Common method variance is a concern when single respondents are used for data collection. There are ex-ante and ex-post ways to deal with this concern (Podsakoff et al., 2003). Ex ante, I made sure the respondents that I asked were knowledgeable, guaranteed them complete anonymity, and asked them to answer questions as best as they can or alternatively leave the question blank (Dillman, 2000). Ex post, I statistically assessed common method bias (CMB) through the Harmon's single factor test. The single unrotated factor explained less than 50 percent of variation and this indicates that CMB is not a major problem.

Multicollinearity

I checked if multicollinearity was an issue using the procedures laid out by Hair et al. (2006) and Shepperd (1991). The correlation between the independent variables was far below a value which could indicate multicollinearity (.10 << .90, Hair et al., 2006). Furthermore, the Variance Inflation Factor (VIF) in the dataset was 1.01. This is very close to the theoretically minimal value of 1 and strongly indicated orthogonal independent variables (i.e. no multicollinearity). Finally, I followed the recommendations by Lubinsky and Humphreys (1990) to include the squared terms of the independent variables in the regression equations. If the squared terms are significant and the interaction term becomes not significant, then multicollinearity is a serious problem. The results however do not show this pattern (see Table 3.4, Model 4).

Control variables

I followed the recommendations of Becker (2005) only to include control variables which have conceptually been argued and empirically been shown to affect the dependent variable. Variables that meet these standards may act as suppressors for the effects of the independent

variables, and affect the (generalizability of the) results of the study. Therefore, such variables should be included in the models. However, if variables do not meet these criteria, they should be excluded from the models in order to avoid an unnecessary increase of Type II errors and a loss of statistical power (Becker, 2005).

As there is very little empirical work on production related investments in transaction specific assets by buyers and suppliers, no control variables that meet these standards have explicitly been identified in literature. Control variables that could be considered are relationship length and industry. These demographics are sometimes controlled for in supply chain literature (e.g. Oosterhuis et al., 2011; Oosterhuis et al., 2012) and, as I will explain, could influence the level of investments in transaction specific assets. For one, it is possible that firms who are in a longer relationship, make more investments in transaction specific assets. Similarly, it is possible that some industries are more capital intensive than others and that firms in these industries make more (transaction specific) investments.

In the data set, relationship length was not significantly correlated to TSAI ($r = .01$, n.s.) and was therefore not included as a control. I furthermore performed an ANOVA test of BIK-codes to assess if industry was significantly associated with TSAI. The ANOVA test indicated that the level of TSAI differs across industries ($F[8,116]=2.44$, $p < .01$). Therefore, industry should be included in the regression analyses. As several industries had few observations and a number of respondents indicated that their plant produced parts and products which covered several similar BIK codes, I grouped the industries in four main groups: production machines and equipment (group 1: n = 63, BIK 29), small devices, machines and equipment (group 2: n = 19, BIK 30-33), transportation means (group 3: n = 19, BIK 34 and 35), and various (metal) parts and products (group 4: n = 24, BIK 28). Grouping industries has additional benefits as it allows us to retain statistical power by introducing fewer variables to the model (which is important given the limited sample size). The F-value of the ANOVA test of TSAI levels across these groups was significant ($F[3,121]=2.55$, $p < .10$) thus indicating that they should be included as controls. I created three dummies to capture the groups (group 1 = default, group 2 = dummy 1, group 3 = dummy 2, group 4 = dummy 3).

Analysis

I tested the hypotheses through hierarchical multiple OLS regressions in SPSS. First, I entered the control variables (i.e. the industry dummies). Second, I added the main variables power imbalance and total dependence. Third, I added their interaction effect. In the fourth and final model, I added the squared values of power imbalance and total dependence as an additional

check for multicollinearity as explained above. In these regressions, I used standardized predictors to enhance the interpretation and minimize multicollinearity problems (Aiken & West, 1991).

In the hypotheses and in the regressions mentioned above, I do not take into account whether the buyer or the supplier has the power advantage. Yet it might be interesting to investigate if TSAI is affected differently as the power advantage of the buyer respectively of the supplier is larger. This would provide further insights in the generalizability of the results. Therefore, I performed additional regressions to search for differences in TSAI under power advantaged buyers versus power advantaged suppliers.

Similar to Gulati and Sytch (2007), I used splines to keep statistical efficiency (i.e. the error term was estimated using the whole dataset). The regression equations which I tested are shown below. In these equations, the dummy variable I denotes whether the buyer or supplier has the power advantage: PI>0 and PI<0. By multiplying this dummy with the PI value, I am able to estimate the beta coefficients for the effects of PI on TSAI when the buyer has the power advantage respectively when the supplier has the power advantage. In the equations below, industry dummies are not explicitly shown but were included as controls.

Model 2 (main effects):

$$TSI = b_0 + b_1 * PI * I_{PI<0} + b_2 * PI * I_{PI>0} + b_3 * TD + error$$

Model 3 (main effects and interaction effects):

$$TSI = b_0 + b_1 * PI * I_{PI<0} + b_2 * PI * I_{PI>0} + b_3 * TD + b_4 * PI * I_{PI<0} * TD + b_5 * PI * I_{PI>0} * TD + error$$

Combined, the variables that indicated a power advantage for the buyer respectively the supplier approximate a z-distribution; if instead of being split in two variables, the cases in which the buyer had a power advantage were coded positive and cases in which the supplier had a power advantage were coded negative, then the mean of the total set of cases would be very close to zero (0.01) and the standard deviation would be almost one (0.99). As the two variables combined already had the desired properties, I did not further standardize them. The main reason for avoiding standardization is that centralization, which is a part of standardization, is theoretically undesirable. By subtracting the mean, cases in which one party had the power advantage (e.g. PI>0) might be re-coded as cases in which the other party has the power advantage (e.g. PI<0).

Ex ante, I expect that the results may somewhat vary depending on whether the power imbalance is used as input in the models or whether the power advantage of the buyer and the power advantage of the supplier are used as input. This is due to the fact that the mean and standard deviation of the power imbalance differ from the mean and standard deviation of the power advantages (mean[5] = .78 versus .40 (buyer) and .38 (supplier); SD = .61 versus .56 (buyer) and .61 (supplier)). Based on Aiken and West (1991), I would expect that the (significance of the) coefficients of the highest-order terms (i.e. the interaction term) would not be affected in the different models. Yet, the (significance of the) coefficients of the lower-order terms in the equation may be different in both cases. The variable of interest, the interaction between power imbalance and total dependence, is the highest-order term and should not be influenced. The t-test for this interaction term will be the same for any combination of standardized, unstandardized, centered, or un-centered data. Naturally, the magnitude of the interaction coefficient will differ (Preacher, 2003).

For all tests, I deemed one-sided significance tests acceptable as I investigated the significance of hypothesized weights.

RESULTS

The results of the regressions are presented in Table 3.4. As can be seen, I found a significant interaction effect (Model 3).

[5] This difference in means arises due to the coding laid out above; if we want to capture the advantage of the buyer, then all cases where the supplier has a power advantage are set to zero (and vice versa if we want to capture the advantage of the supplier). As the number of cases in which the buyer respectively the supplier has the power advantage is approximately half of the dataset, the mean values these power advantages are approximately half of the mean when we consider the power imbalance for the entire dataset.

Table 3.4: Results of OLS regression for standardized independent variables. PI=Power imbalance, TD=Total dependence, TSAI=Investments in transaction specific assets. Industry BIK 29 was taken as the reference group, for all other industry groups dummies were constructed.

TSAI

	Model 1		**Model 2**		**Model 3**		**Model 4**	
	Estimate	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*
Constant	1.90**	0.09	1.91**	0.08	1.94**	0.08	1.96**	0.10
Dummy_1	0.33*	0.18	0.36*	0.17	0.38*	0.16	0.38*	0.17
Dummy_2	0.43**	0.18	0.30*	0.18	0.30*	0.17	0.30*	0.17
Dummy_3	0.13	0.16	0.16	0.16	0.11	0.15	0.12	0.15
TD			0.20**	0.06	0.26**	0.06	0.26**	0.06
PI			-0.09	0.06	-0.06	0.06	-0.04	0.08
PI x TD					0.23**	0.07	0.23**	0.07
PI^2							-0.02	0.04
TD^2							-0.00	0.05
R-squared	*.06**		*.16**		*.24**		*.24**	
R-squared change	*.06**		*.10**		*.08**		*.00*	

** significant at p < .01

* significant at p < .05

To gain insights in the interaction, I created Figure 3.1 by using the procedures of Aiken and West (1991). Figure 3.1 shows the significant two-way interaction between power imbalance and total dependence for TSAI. As expected, PI was significantly negatively related to TSAI at low levels of TD (simple slope: b = -.29, p < .01) and significantly positively related to TSAI at high levels of TD (simple slope: b = .17, p <.05). H1 was thus supported.

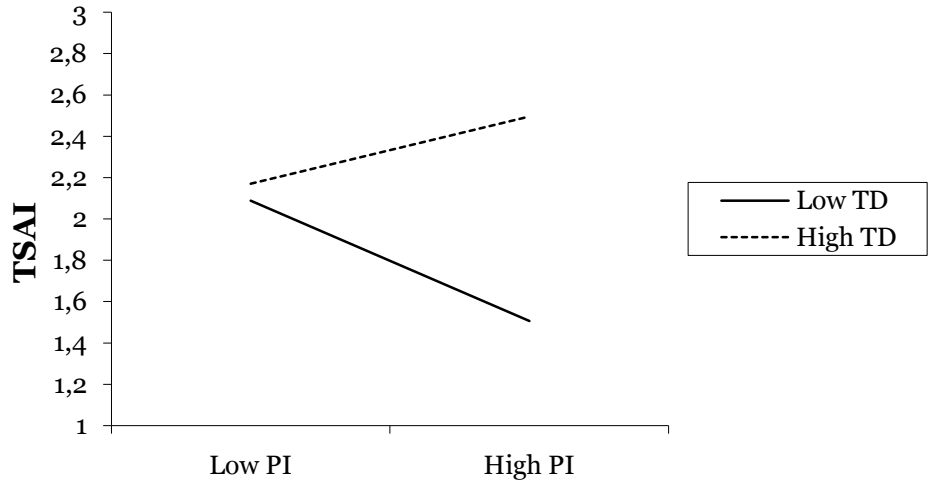

Figure 3.1: Power imbalance (PI) and Investments in transaction specific assets (TSAI) at different levels of Total Dependence (TD)

The results remain similar (although not identical) if I distinguish who has the power advantage (see Table 3.5). Both the power advantage of the buyer and the power advantage of the supplier were significantly negatively related to TSAI at low levels of TD (simple slope: b=-.42, p<.01; respectively b=-.59, p<.01). At high levels of TD, the power advantage of the supplier was significantly positively related to TSAI (simple slope: b=.33, p<.05), and the power advantage of the buyer was positively yet not significantly related to TSAI (simple slope: b=.26, n.s.).

Table 3.5: Results of OLS regression when distinguishing whether the buyer or the supplier is more powerful. PB=Power advantage buyer, PS=Power advantage supplier, TD=Total dependence, TSAI=Investments in transaction specific assets.

TSAI

	Model 1		**Model 2**		**Model 3**	
	Estimate	*SE*	*Estimate*	*SE*	*Estimate*	*SE*
Constant	1.90**	0.09	2.03**	0.11	2.01**	0.11
Dummy_1	0.33*	0.18	0.36*	0.17	0.39*	0.17
Dummy_2	0.43*	0.18	0.30*	0.18	0.30*	0.17
Dummy_3	0.13	0.16	0.16	0.16	0.11	0.15
TD			0.20**	0.06	-0.04	0.09
PB			-0.16	0.12	-0.08	0.12
PS			-0.14	0.11	-0.13	0.11
PB x TD					0.34**	0.13
PS x TD					0.46**	0.14
R-squared	*.06**		*.16**		*.24**	
R-squared change	*.06**		*.10**		*.08**	

** significant at p <.01

* significant at p < .05

DISCUSSION

Past studies indicated that the effect of power imbalance on investments between buyers and suppliers is conditional on levels of total dependence. Yet, they did not empirically investigate such interaction for production related investments in transaction specific assets by buyers and suppliers. In this study, I argued that the link between power imbalance and such investments in transaction specific assets is moderated by total dependence. I expected a negative link when total dependence is low and a positive link when total dependence is high. I found a significant interaction effect for power imbalance and total dependence which confirmed the expectations. Yet, I also found that it matters who has the power advantage; while the results are identical when total dependence is low, when total dependence is high the link is only positive when the supplier is power advantaged but insignificant when the buyer is power advantaged. I will now discuss the theoretical and practical implications of the findings, and provide suggestions for further research.

Theoretical and practical implications

The study has several implications for theory and business practice.

First, I add to supply chain literature by providing insights into the conditions under which production related investments in transaction specific assets by buyers and suppliers are likely to occur. The study empirically demonstrated that such investments in transaction specific assets are predicted by the two tenets of resource dependence theory: power imbalance and total dependence. The findings imply that practitioners have to take both tenets of resource dependence theory simultaneously into consideration when making decisions regarding investments in transaction specific assets. Prior literature which was popularized among practitioners tended to stress that only the power imbalance between firms mattered; it gave normative advice that the powerful firm should abstain from making investments in transaction specific assets (e.g. Kraljic, 1983; Porter, 1980). The study argued and empirically demonstrated that a power imbalance does not necessarily hinder investments in transaction specific assets. When total dependence is high, power imbalance can act as an enabler of investments in transaction specific assets. Thus, I showed that some popular normative management theories seem to contradict business practice.

Second, the study extends the limited empirical literature on how resource dependence theory can be applied to business practice (Pfeffer & Salancik, 2003). Specifically, although interaction effects between the two tenets of resource dependence theory were proposed by various studies, such effects were not investigated for improving the flow of materials between buyers and suppliers by means of investments in transaction specific assets. The study explicitly tested for interaction effects and showed that the effect of power imbalance is contingent on the level of total dependence. The empirical study thus contributes to a better applicability of resource dependence theory to business practice.

Third, by empirically studying the link between resource dependence and (production related) investments in transaction specific assets, the study links two important economic theories: resource dependence theory (Pfeffer & Salancik, 1978) and transaction cost theory (Williamson, 1985). In line with Casciaro and Piskorski (2005), I argued that these theories are complementary to each other as they deal with different types of dependence; resource dependence theory stipulates ex-ante dependence while transaction cost theory focuses on ex-post dependence. The results indicated that both theories are indeed complementary to each other; as suggested by Casciaro & Piskorski (2005) ex-ante dependence due to structural market restrictions affects the extent to which firms invest in their relationship. I consider further research on how TSAI may in turn affect additional ex-post dependence that may arise from

such investments as very beneficial. Capturing these effects was out of the scope of this study and future longitudinal work is necessary to better understand these effects. Further research should also take into consideration that while both theories may complement each other, they also clash on an important assumption that is at their very core: the assumption about the nature of mankind. Transaction cost theory strongly builds on the assumption of opportunism and argues that decisions of firms will be strongly guided by the intent to avoid the opportunism of others. It is argued that firms will (and should) aim to reduce opportunism of their partners to produce poor quality goods, deliver products late, or not follow through with provisions of a contract. Resource dependence theory on the other hand is less concerned with opportunism; according to the theory, the resource dependence setting determines to which extent firms get their needs met in relationships with others. Firms can try to influence this resource dependence setting (i.e. either by increasing the dependence of the other firm or by decreasing their own dependence) to get a larger share of the value created within a supply chain dyad. Thus, resource dependence theory seems to hold a much more neutral perspective on the nature of mankind; one could argue that the assumption behind resource dependence theory promotes fairness as firms pursue their self interest in a transparent way. It is difficult to chose which assumption is more valid; on one hand, transaction cost theory has been highly critiqued for promoting unethical business conduct by assuming opportunism (Goshal & Moran, 1996). On the other hand, as opportunism and unethical business conduct have been documented to hold in business practice, such issues should not be neglected. Departing from different assumptions, the reasoning regarding the goal of firms within a relationship and the use of power will be very different. In this study, we relied on resource dependence theory for developing the reasoning as firms in The Netherlands are have relatively high standards of ethical business conduct (Scholtens & Dam, 2007). Yet, as demonstrated by Scholtens and Dam (2007), the standards for ethical business conduct differ across countries due to cultural considerations. For the reasons laid out above, it is therefore possible that the reasoning and the found effects may be different in other countries with different cultures.

Fourth, this study, which focuses on production related investments in transaction specific assets by buyers and suppliers, extends our knowledge of what asset specificity between firms entails. Prior empirical studies have mostly focused on unilateral investments in transaction specific assets in sales (e.g. Anderson & Coughlan, 1987; Christiaanse & Venkatraman, 2002; Klein et al., 1990; Zaheer & Venkatraman, 1994). This study complements this prior work as it focuses on TSAI in production by both buyers and suppliers, and thus

promotes a better understanding of the various facets of investments in transaction specific assets.

Fifth, the results demonstrate that a power imbalance does not per se act as a barrier for investments between actors. Various papers in the field of psychology and sociology have argued that a power imbalance triggers negative psychological reactions and destructive behaviors which drive actors apart instead of tightening their bond (e.g. Dépret & Fiske, 1999; Fiske, 1993; Fiske et al., 2004). Building upon such studies, some supply chain literature has argued that because a powerful firm is oblivious to the needs of the less powerful firm and/or abuses his power, he may be content with resource uncertainty and may not want to invest in the relationship (e.g. Gulati & Sytch, 2007; Piskorski & Casciaro, 2006). In this study I argued that this negative effect of power imbalance on investments does not necessarily hold. Instead I reasoned that the powerful firm trades off the benefits, costs and risks of tightening the bond between themselves and the less powerful firm. As such, I did not stigmatize power as 'bad' nor did I present the powerful as a socially dysfunctional entity or a villain. Instead I argued that firms act as economically rational actors who seek to balance the benefits which are jointly created by themselves and others, with their individual interest in the relationship.

Limitations and directions for future research

This study contains several limitations and directions for future research.

First, the cross-sectional design of the survey does not make it possible to prove causality. I expect that business reality is rather dynamic and that various variables cyclically influence each other. As indicated by literature in psychology and sociology (e.g. Marsden, 1981; Provan, 1993; Uzzi, 1997), high bi-lateral dependences are likely to result in increased social interaction, a longer relationship, more understanding of each other's interests, and more mutual trust. This in turn imposes psychological switching costs and results in a lower likelihood that firms will switch partners. Similarly, investments in transaction specific assets can make it more difficult for firms to switch to other partners over time. Due to such mechanisms, firms who are highly resource dependent on others may increasingly get sucked into the relationship. Therefore, I would advise future studies to conduct longitudinal research to gain further insights into the interplay between these variables.

Second, this study may be prone to mono-source bias as I collected the data at a single respondent at the buyer. However, attributing the significant interaction found in this study to the use of single respondents would be difficult (McClelland & Judd, 1993). Yet, we would recommend that future research would investigate if this is indeed the case. As the survey

responses were gathered at the buyer side, it would be interesting to capture to which extent respondents at the supplier have different perceptions of the concepts measured in this study, and how this affects the outcomes of our study (see also Oosterhuis et al., 2013).

Third, it would be beneficial to test if the effects on supplier performance which were implied in this study indeed hold. How do the benefits, costs, and risks of constraint absorption by means of investments in transaction specific assets manifest? It would be insightful to further investigate these issues.

Fourth, I focused on only one way in which the exchange of resources between buyers and suppliers could be improved: investments in transaction specific assets. It would be beneficial to investigate how resource dependence affects other means by which the exchange of resources could be improved, and how these means jointly affect exchange performance. As suggested by Van der Vaart and Van Donk (2008) and Vallet-Bellmunt and Rivera-Torres (2013) attention could also be paid to attitudes (e.g. trust, common goals, conflict, etc.) and patterns (e.g. supplier involvement) in buyer-supplier dyads. This would increase our theoretical understanding of when and why the different means occur in business practice. Furthermore, it would enhance the applicability for supply chain practitioners who need to decide on these separate aspects.

Fifth, I would like to encourage research on whether improving the exchange of resources through production related investments in transaction specific assets is different for powerful buyers and powerful suppliers. In this study, I found that the power advantage of the supplier was positively linked to higher investments in transaction specific assets when total dependence was high. The power advantage of the buyer on the other hand was not significantly linked to higher investments in transaction specific assets when total dependence was high. It would deserve further investigation to understand why this difference occurs. It is possible, for example, that buyers have been influenced by dominant purchasing literature (Kraljic, 1983) which explicitly advises buyers to abstain from making investments in transaction specific assets as this could undermine their bargaining position within their supplier relationships.

Conclusion

Concluding, this study theoretically argued and empirically substantiated how the two tenets of resource dependence theory relate to production related investments in transaction specific assets between buyers and suppliers. I showed that the effect of power imbalance on such investments in transaction specific assets is moderated by total dependence. When total dependence is low, power imbalance has a negative link with investments in transaction specific

assets. When total dependence is high, power imbalance has a positive link with investments in transaction specific assets but this holds only for cases when the supplier is power advantaged; the link is insignificant in cases when the buyer is power advantaged.

CHAPTER 4
How do resource dependences affect the relationship between technology uncertainty and supplier involvement?

INTRODUCTION

Although literature has recognized that supplier involvement in the decision making of buyers can yield significant benefits (e.g. Barratt, 2004; Ireland & Bruce, 2000; Jayaram, 2008; Primo & Amundson, 2002; Ragatz et al., 2002; Ragatz et al., 1997; Simatupang & Sridharan, 2002), our understanding about when such supplier involvement occurs is limited.

In this study, I investigate how two important drivers for supplier involvement (i.e. technology uncertainty and resource dependence) jointly influence supplier involvement. Supplier involvement is defined as involvement of the supplier in decisions of the buyer in product and process design and adaptation, cost control and quality improvement (Gulati & Sytch, 2007; Johnston et al., 2004). Technology uncertainty concerns changes in the standards or specifications of products and processes inherent to a buying firm's industry (Geyskens et al., 2006; Heide & John, 1990; Oosterhuis et al., 2011; Walker & Weber, 1984). It reduces the ability of buyers to control the flow of materials, imposes adaptation problems, and thus increases the need for additional aid from suppliers in the design of and adaptations to products and processes (Pfeffer & Salancik, 1978; Chen & Paulraj, 2004). The resource dependence of a firm on another firm indicates if it can easily get the resources it obtains from the second firm from an alternative partner (Pfeffer & Salancik, 1978). As such, resource dependence reflects two things. For one, it indicates the extent to which one firm needs to maintain and foster the exchange with a respective other firm. Simultaneously, it reflects how much incentive the second firm has to shield his organization from the first firm in order to preserve the uniqueness of the resources which he produces. This uniqueness is the fundament of his competitive advantage and bargaining position.

As I will lay out, while literature has indicated that both technology uncertainty and the resource dependence setting influence supplier involvement, it is unclear what their joint effects are. For one, evidence that suppliers tend to be more involved in tactical and strategic decisions of the buyer as technology uncertainty at the buyer is higher, has been presented by various authors (Chen & Paulraj, 2004; Paulraj & Chen, 2007; Zhou & Benton, 2007; Sakakibara, 1993; Iansiti & MacCormack, 1997). Simultaneously, literature has indicated that buying firms have

reasons not to involve their suppliers in decisions that could expose their core business (Frazier et al., 2009; Kraljic, 1983; Porter, 1980; Sislian & Satir, 2000; Wathne & Heide, 2000). In particular, such authors propagate that a power advantaged buyer (i.e. a buyer whose resource dependence on the supplier is low while the resource dependence of the supplier on the buyer is high) should block supplier involvement. As I will explain in the Theory section, by shielding his organization strategically, the powerful buyer protects his competitive advantage and his bargaining position. This line of reasoning has also been documented to hold in business practice; in the 1980s and 1990s powerful manufacturers in the U.S. automobile industry blocked supplier involvement in order to be able to keep supplier prices low (Mudambi & Helper, 1998). In sum, there are indications that the effect of technology uncertainty on supplier involvement may not hold in all resource dependence settings. Yet, the joint effects of technology uncertainty and resource dependence on supplier involvement have not been assessed empirically. It is of both theoretical and of practical importance to understand under which conditions supplier involvement is likely to occur. This study addresses the current gap and thus contributes to both theory and business practice.

In this study, I expect that the effect of technology uncertainty on supplier involvement is moderated by both the resource dependence of the buyer on the supplier and the resource dependence of the supplier on the buyer. I hypothesize that the supplier will be less involved in the decision making of the buyer as technology uncertainty is higher, when the buyer has a large power advantage (i.e. when the buyer is only slightly dependent on the business of the supplier while the supplier is very dependent on the buyer). As I will explain further on, the reason for this is that a buyer with a power advantage will increasingly shield his organization from the supplier as technology uncertainty is higher in order to maintain his competitive advantage and strong bargaining position. In all other resource dependence settings, I expect a positive effect of technology uncertainty on supplier involvement.

This study makes several contributions. First, I increase the theoretical and practical understanding regarding the circumstances under which supplier involvement is likely to occur. Such clarity is currently lacking. On one hand, there is abundant evidence that buyers need to involve their suppliers in their business in order to stay competitive (e.g. Frohlich & Westbrook, 2001; Primo & Amundson, 2002; Ragatz et al., 2002; Van der Vaart & Van Donk, 2008) and that technology uncertainty increases the need for supplier involvement (e.g. Chen & Paulraj, 2004; Paulraj & Chen, 2007; Zhou & Benton, 2007). On the other hand, practitioners have also received normative recommendations to maintain distance to their suppliers in order to protect their competitive advantage and bargaining position (Kraljic, 1983; Porter, 1980). Second, I

contribute to the applicability of resource dependence theory (Pfeffer & Salancik, 1978) by providing insights how resource dependences affect buyer-supplier exchanges. Such insights are theoretically necessary; while resource dependence theory is widely cited and generally considered a powerful general metaphor, there is a limited amount of empirical work explicitly extending and testing the theory (Casciaro & Piskorski, 2005; Pfeffer & Salancik, 2003). To test the hypotheses, I conduct a survey of 125 buyer-supplier relations in the Dutch discrete manufacturing industries.

THEORETICAL FRAMEWORK

Supplier involvement

There is a large amount of literature on the topic of supplier involvement (e.g. Burt & Soukup, 1985, Clark & Fujimoto, 1991; Helper, 1991; Hakansson & Eriksson, 1993; Lamming, 1993; Hines, 1994; Paulraj & Chen, 2004; Ragatz et al., 1997; Dowlatshahi, 1998, 2000; Swink, 1999; Shin et al., 2000). In this literature, authors emphasize that supplier involvement can occur in various areas such as the design and adaptation of products and processes, cost control and quality improvement (Biehl et al., 2006; Gulati & Sytch, 2007; Johnston et al, 2004). Furthermore, literature states that supplier involvement can range from giving minor suggestions to being completely responsible for the development, design and engineering of those activities (Paulraj & Chen, 2004; Wynstra & Pierick, 2000; Wynstra et al., 2000). While there is consensus regarding what supplier involvement entails, some authors tend to name the concept of 'supplier involvement' differently. For example, Gulati and Sytch (2007) refer to 'Joint Action' and Johnston et al. (2004) prefer the term 'Integrated Decision Making'.

Literature indicates that through supplier involvement, buying and supplying firms can improve the flow of materials throughout the supply chain. The extent to which such improvements can be made is substantial; various studies show that 30 percent of the quality problems and 80 percent of the product lead-time problems originate at suppliers (Burton, 1988; Naumann & Reck, 1982; Paulraj & Chen, 2004). Through supplier involvement such disturbance can be counteracted (i.e. by providing the supplier detailed insights into the buyer's needs and processes the supplier can help to shape the supply chain so that his processes are tailored to the needs and processes of the buyer). Consequently, buyers and suppliers can derive benefits such as reduced transaction costs of producing and distributing a good or service, increased revenue through reduced uncertainty for buyer and supplier, increased innovativeness, improved quality of purchased components, reduced lead times, and enhanced

supply chain responsiveness (Cayer, 1988; Clark & Fujimoto, 1991; Eisenhardt & Tabrizi, 1994; Maloni & Benton, 2000; Ragatz et al., 1997, 2002; Primo & Amundson, 2002).

Yet, supplier involvement may also have significant disadvantages (e.g. Primo & Anderson, 2002; Ragatz et al., 2002). Supplier involvement can be regarded as an permeation of organizational boundaries (Heide & John, 1990). As such, first, supplier involvement can expose strategic information which is critical to the competitive advantage of the firm whose boundaries are being penetrated (i.e. the buyer in this study). This competitive advantage could be damaged if strategic information leaks to one of the competitors of the buyer or if the supplier himself uses it to branch out into the market of the buyer. A firm needs to protect its competitive advantage as it is the fundament based on which a firm can survive on the market compared to its rivals (Porter, 1980). Second, even if strategic information is not leaked to competitors and the supplier does not bypass the buyer, by possessing such information the supplier can more credibly threaten to exit the relationship and use it against the buyer. As such, the bargaining position of the buyer within the relationship with the supplier could deteriorate. Third, supplier involvement can signal that a buyer who involves a supplier in his decision making does not have intentions to leave the relationship. Thus, the threat of buyer to leave the relationship may deteriorate which may negatively affect his bargaining position and the performance which he receives from the supplier (Casciaro & Piskorski, 2005; Mudambi & Helper, 1998; Pfeffer & Salancik, 1978). In sum, there are not only benefits to supplier involvement, but there also may be severe disadvantages.

Technology uncertainty

Technology uncertainty at the buyer exists if the standards and specifications of products and processes change quickly in the industry of the buyer (Geyskens et al., 2006; Heide & John, 1990; Walker & Weber, 1984). Technology uncertainty at the buyer may disrupt the flow of materials throughout the supply chain as it poses adaptation problems for the various supply chain links (Noordewier et al. 1990; Stump, 1995; Zsidisin et. al., 2000; Zsidisin, 2003). Such adaptation problems may lead to products that do not meet the requirements of the end-customers (e.g. products have undetected quality flaws and/or are delivered late; Fynes & Voss, 2002; Zsidisin, 2003). Alternatively, the end-consumer may not receive any products at all (e.g. previously used components may not fit the adapted products of a buying firm anymore, causing observable quality problems and/or product malfunctioning which makes it impossible to deliver these products; Fynes & Voss, 2002; Pfohl et al., 2011; Wu et al., 2006). As a result, revenue loss may occur which primarily affects the buyer but also spreads throughout the supply

chain and impacts the buyer's suppliers (Flynn et al., 1997; Fynes & Voss, 2002; Tse & Tan, 2011; Tse et al., 2011; Zsidisin et al., 2000). Therefore, it is not only in the interest of the buyer to resolve technology uncertainty but it is also in the interest of the buyer's suppliers.

Resource dependences

Resource dependence indicates the extent to which a firm needs to maintain the exchange of resources with its current partner (Pfeffer & Salancik, 1978). It reflects the number of alternative partners a firm has in the short respectively long run, switching costs to an alternative partner, and disruption costs when the relationship is terminated (e.g. Brass, 1984; Burt, 1982; Gulati & Sytch, 2007; Kumar et al., 1995; Kumar et al., 1998).

If the resource dependence of one firm on the other firm is lower than vice versa, then the first firm has a power advantage and the second firm by definition has a power disadvantage (Gulati & Sytch, 2007; Kumar et al., 1995; Pfeffer & Salancik, 1978; Piskorski & Casciaro, 2006). A power advantage greatly affects how the interactions between firms are structured. Because the less dependent actor can more credibly threaten the more dependent actor to leave the exchange than vice versa, he will dominate the exchange and determine the conditions of the relationship (Burt, 1983; Emerson, 1962; Friedkin, 1986; Lawler & Bacharach, 1987; Pfeffer & Salancik, 1978; Pfeffer & Leong, 1977; Piskorski & Casciaro, 2006; Porter, 1980; Provan et al., 1980; Ven et al., 1976). The more dependent firm will accept this outcome inequality because he will face greater resource uncertainty and worse exchange conditions than vice versa should the exchange of resources fail (Casciaro & Piskorski, 2005).

Relationship between supplier involvement, technology uncertainty and resource dependences

As laid out, buyers may want to involve suppliers in their decision making processes to counteract technology uncertainty and assure the flow of materials throughout the supply chain (Chen & Paulraj, 2004; Fynes et al., 2005; Galbraith, 1973; Jap, 1999; Paulraj & Chen, 2007; Stock & Tatikonda, 2008; Tushman & Nadler, 1978; Zhou & Benton, 2007). When buyers perceive little technology uncertainty, there is little need to involve suppliers in decision making processes. In such cases, communication with the supplier will only be costly and distractive (e.g. Oosterhuis et al., 2011).

While technology uncertainty can be counteracted by supplier involvement, this may also carry risks for the buyer. Technology uncertainty at the buyer offers increased opportunities for a supplier to penetrate the organizational boundaries of the buyer; the higher the technology

uncertainty, the more information the buyer has to disclose that is critical to his competitive advantage in order to achieve meaningful supplier involvement. This is dangerous for buyers who possess a power advantage over their supplier (Frazier et al., 2009; Kraljic, 1983; Porter, 1980; Sislian & Satir, 2000; Wathne & Heide, 2000). In such cases, the buyer who is difficult to replace for the supplier (i.e. the supplier dependence on the buyer is high), has a competitive advantage and a bargaining position to protect (Kraljic, 1983; Mudambi & Helper, 1998). The supplier on the other hand, who heavily relies on the business of the buyer but does not have to offer unique value to the buyer, is eager to gain insights into the competitive advantage of the buyer. Better understanding the needs and processes of the buyer would tie the buyer closer to the supplier and thus improve his bargaining position, or even let him copy the competitive advantage of the buyer (Frazier et al., 2009; Mudambi & Helper, 1998; Porter, 1980). To avoid this, power advantaged buyers will strive to protect themselves from penetration of their firm-boundaries through supplier involvement. Power advantaged buyers will thus increasingly block supplier involvement as technology uncertainty is higher. As mentioned previously, technology uncertainty is crucial for understanding supplier involvement; supplier involvement increasingly becomes an issue for the buyer as technology uncertainty is higher. Formulated differently, if technology uncertainty is low, there is no reason for the buyer to involve the supplier in his decision making. Due to the reasons laid out above, we thus need to consider both technology uncertainty as well as the power advantage of the buyer.

In cases where the buyer does not have a power advantage to protect, he will allow for more supplier involvement as technology uncertainty is higher. When the resource dependence of the supplier on the buyer is low, he is not interested in gaining strategic information from the buyer; the buyer does not possess specific resources or a unique competitive advantage that the supplier would be interested in. The buyer is only one of many potential buyers for the supplier, and there is no specific reason why the supplier would invest the significant time and effort associated with supplier involvement to understand the specific needs and processes of this buyer. As the buyer is easily replaceable, the supplier also does not have a weak bargaining position towards the buyer which he needs to manage further. In cases where supplier dependence is low, the buyer thus has no reason to block supplier involvement.

Regardless of his resource dependence, the supplier will generally be willing to engage in supplier involvement in order to counteract technology uncertainty; due to the sequential interdependence between buyers and suppliers, technology uncertainty at the buyer would also cause disruptions at the supplier which would increase his costs and lower his revenue (Chen & Paulraj, 2004; Paulraj & Chen, 2007; Zhou & Benton, 2007; Sakakibara, 1993; Iansiti &

MacCormack, 1997). Opposing to the buyer, the supplier does not face any strategic risk in any resource dependence setting as his organizational boundaries are not penetrated by being involved in the decisions of the buyer.

When both supplier dependence and buyer dependence are high, both firms are 'tied' to the relationship. Literature has indicated that high dependences increase cohesiveness between firms and the amount of interaction between them. Under such conditions, the risk of relationship termination is low; both firms achieve a symbiosis as there is a higher understanding of each other's interests, more cooperation and more mutually beneficial behavior (Gulati & Gargiulo, 1999; Lawler & Yoon, 1996; Lawler et al., 2000; Marsden, 1981; Provan, 1993; Uzzi, 1997).

I thus expect that in settings where the resource dependences of buyer and supplier are balanced, or where the supplier has a power advantage, there will be more supplier involvement as technology uncertainty is higher. In sum, I formulate the following hypotheses:

H1: The resource dependences between buyers and suppliers will jointly moderate the relationship between technology uncertainty and supplier involvement.

H1a: The relationship between technology uncertainty and supplier involvement will be negative if the buyer's resource dependence is low and the supplier's resource dependence is high.

H1b: The relationship between technology uncertainty and supplier involvement will be positive if the buyer's resource dependence is low and the supplier's resource dependence is low.

H1c: The relationship between technology uncertainty and supplier involvement will be positive if the buyer's resource dependence is high and the supplier's resource dependence is low.

H1d: The relationship between technology uncertainty and supplier involvement will be positive if the buyer's resource dependence is high and the supplier's resource dependence is high.

The expected three-way interaction between the main concepts is shown in Figure 4.1.

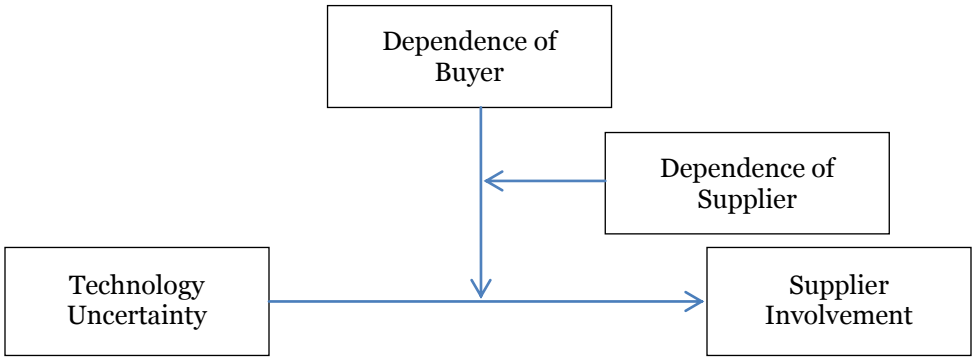

Figure 4.1: Theoretical Model

METHODOLOGY

Data

To test the hypotheses I conducted a survey among Dutch firms in the discrete manufacturing industries with more than 50 employees (Dutch Chamber of Commerce BIK codes 28- 35; 28 Metal parts and products; 29 Machines and Equipment; 30 Office Equipment and Computers; 31 Other Electronic Machines, Devices and Appliances; 32 Audio-, Video- and Telecommunication- Devices and Appliances; 33 Medical Devices and Instruments; 34 Cars and Trailers; 35 Transportation means other than cars). Approximately 700 firms formed the target population. Respondents were approached by telephone. If the manager in charge of supply chain relations agreed to participate, a link to a website was sent to them where they could fill in the questionnaire online. In case the questionnaire was not filled in after 2 weeks, I phoned the respondent again to remind them. In order to keep the supply chain relationships comparable, I asked respondents at the buyer to fill in the survey for their fourth largest supply relationship in terms of revenue. Compared to the largest supplier, the choice for the fourth largest supplier controls for the potentially confounding effects on supplier involvement caused by the importance of a supplier and by the amount of purchases at the supplier, and it diminishes social desirability bias (e.g. Anderson & Narus, 1990; Zaheer et al., 1998). I collected 125 completed questionnaires (i.e. the response rate was 18 percent). Firms who did not agree to participate in the questionnaire stated this was due to a lack of time or a firm policy not to engage in surveys.

Measures

Content validity was achieved through a comprehensive review of literature to distill initial items, and the involvement of practitioners and researchers to further refine them. First, five academics from different disciplines in business and economics reviewed the items. Thereafter, twelve supply chain practitioners commented on the appropriateness of the research constructs and items. No items that were ambiguous or inappropriate were identified. Furthermore, the academics and practitioners deemed the constructs to be completely covered by the items. The questions, items, and answer categories of all scales are provided in the Appendix.

Supplier involvement

To create the supplier involvement construct, I reviewed and slightly adapted the 'joint action' construct of Gulati and Sytch (2007). This scale was designed to reflect the involvement of the supplier in the decision making of the buyer and as such covered the construct which I aimed to measure. Compared to the original scale, however, the scale I used is more explicit; for example I specified whether the supplier is involved in the design of the product or in the design of the production process (whilst the scales of Gulati & Sytch solely capture involvement in 'design'). As such, I aimed to achieve a more valid scale than the scale of Gulati and Sytch (2007).

Technology uncertainty

The technology uncertainty measure was developed to reflect unpredictable changes in products and processes (e.g. Dess & Davis, 1984; Miller & Friesen, 1983; Zhou & Benton, 2007). To achieve this, I complemented the 'technology uncertainty' scale of Chen and Paulraj (2004), which emphasized process innovation, with the 'supply chain dynamism' scale of Zhou and Benton (2007), which more explicitly included items on uncertainty regarding products. Respondents of buying firms were asked to answer these questions for the products of their firm for which the supplier supplies components.

Resource dependence

The measures for resource dependence were adapted from Gulati and Sytch (2007) to reflect the number of alternative partners on the short and on the long term (Brass, 1984; Burt, 1982; Kumar et al., 1995; Kumar et al., 1998), the costs of switching to an alternative partner (Heide & John, 1988), and the extent of potential disruptions in production or sales if a switch would occur (e.g. El-Ansary & Stern, 1972; Pfeffer, 1972; Pfeffer & Salancik, 1978; Pugh et al., 1969).

After reverse-scaling of negatively formulated items, an average was calculated to construct buyer dependence and supplier dependence.

Measurement model

Validation of constructs

Using the survey data, an Exploratory Factor Analysis (EFA) was performed in SPSS. To form factors, I used the principal component method with Varimax rotation. The number of factors extracted was based on theoretical considerations, the scree plot, and eigenvalues higher than one. Items were retained if they had high loadings on their own factor and low loadings on other factors (See Table 4.1).

The items loaded on the four expected factors: technology uncertainty (TU), buyer dependence (BD), supplier dependence (SD), and supplier involvement (SI). There were no significant cross-loadings. The variance explained was 61.1%. Cronbach's alpha was .79 for BD and .77 for SD which compares favorably to prior studies (e.g. Gulati & Sytch, 2007). Furthermore, Cronbach's alpha was .84 for TU and .87 for SI.

Table 4.2 shows the descriptives of and correlations between the main variables. All independent variables (BD, SD, and TU) are significantly positively correlated to supplier involvement (SI). This is in congruence with literature (Chen & Paulraj, 2004; Gulati & Sytch, 2007; Paulraj & Chen, 2007; Zhou & Benton, 2007). Furthermore, as indicated by prior studies, the dependences of the buyer and the supplier are also significantly positively correlated (e.g. Gulati & Sytch, 2007).

Table 4.1: EFA result for Supplier involvement (SI), Technology Uncertainty (TU), Buyer Dependence (BD), and Supplier Dependence (SD). Factor loadings above .40 are shown.

Construct / Item	**Factor loadings**			
	F1-SI	*F2-TU*	*F3-DB*	*F4-SD*
Initial product design	.70			
Product modification	.80			
Initial production process design	.78			
Production process modification	.81			
Production process planning	.72			
Quality improvement	.73			
Cost control	.66			
Products and services are innovated frequently.		.80		

The innovation rate of operating processes is high.		.79		
These products are characterized by rapidly changing technology.		.81		
If we don't keep up with changes in technology, it will be difficult for us to remain competitive.		.65		
Production processes quickly become outdated for these products.		.66		
The production technology changes frequently and sufficiently.		.77		
It would require much trouble and expense for us to switch to another supplier.			-.70	
For the components which we procure from this supplier, there are enough other potential suppliers to ensure adequate competition among the current suppliers.			.82	
There are satisfactory alternative sources of short-term supply available for these components.			.83	
We would face serious production problems if this supplier stopped supplying these components to us.			-.67	
If we withdrew our business from this supplier, it would require much trouble and expense for them to find other buyers.				.77
For the components which we procure from this supplier, this supplier can find enough other potential buyers to get an adequate price.				-.82
On the short-term, there are satisfactory alternative buyers available for this supplier's components.				-.62
This supplier would face a serious financial crisis if we withdrew our business from them.				.73
Initial Eigenvalue	*5.38*	*3.27*	*2.50*	*1.69*
% of variance	*25.6%*	*15.6%*	*11.9%*	*8.0%*
Cumulative % of variance	*25.6%*	*41.2%*	*53.1%*	*61.1%*

Table 4.2: Descriptives and correlations of Supplier Involvement (SI), Technology Uncertainty (TU), Buyer Dependence (BD), and Supplier Dependence (SD).

Variables	Mean	SD	Min	Max	1	2	3	4
1. BD	3.02	0.92	1.00	4.75	---			
2. SD	3.03	0.80	1.00	5.00	.34**	---		
3. TU	2.70	0.69	1.00	4.33	.12	.00	---	
4. SI	1.89	0.84	1.00	4.14	.25**	.21*	.28**	--

** significant at $p < .01$

* significant at $p < .05$

Common method variance

Common method variance is a concern when single respondents are used for data collection. There are ex ante and ex post ways to deal with this concern (Podsakoff et al., 2003). Ex ante, I made sure the respondents that I asked were knowledgeable, guaranteed them complete anonymity, and asked them to answer questions as best as they can or alternatively leave the question blank (Dillman, 2000). No items were left blank by the respondents. Ex post, I statistically assessed common method bias (CMB) through the Harmon's single factor test. The single unrotated factors explained less than 50 percent of variation and this indicates that CMB is not a major concern.

Control variables

I followed the recommendations of Becker (2005) only to include control variables which have conceptually been argued and empirically been shown to affect the dependent variable. Variables that meet these standards may act as suppressors for the effects of the independent variables, and may affect the (generalizability of the) results of the study. Therefore, such variables should be included in the models. However, if variables do not meet these criteria, they should be excluded from the models in order to avoid Type II errors and a loss of statistical power (Becker, 2005).

While there is an abundant body of literature on supplier involvement, no control variables that meet these standards have explicitly been identified in literature. Control variables that could be considered are relationship length and industry. These demographics are sometimes controlled for in supply chain literature (e.g. Oosterhuis et al., 2011; Oosterhuis et al., 2012) and could influence the level of supplier involvement. For one, it is possible that buying firms may involve suppliers with whom they have a longer relationship more than suppliers with whom they have a relatively short relationship. Similarly, it is possible that supplier involvement is more common in some industries than in others (although this reasoning is a bit of a stretch).

In the data set, relationship length was not significantly correlated to SI ($r = -.11$, n.s.) and was therefore not included as a control. I furthermore performed an ANOVA test of BIK-codes to assess if industry was significantly associated with SI. The ANOVA test indicated that the level of SI does not differ across industries ($F[8,116] = .97$, n.s.). Therefore, industry should not be included in the regression analyses.

Analysis

I tested the hypotheses through hierarchical multiple OLS regressions in SPSS. I first included the independent variables technology uncertainty (TU), buyer dependence (BD) and supplier dependence (SD). In the second model, I added the interaction effects between TU and BD, TU and SD, and DB and SD. In the third model, I added the interaction between the three variables (TU, BD, and SD). In all regressions, I used standardized predictors to enhance the interpretation and to reduce multicollinearity problems (Aiken & West, 1991). For all tests, I deemed one-sided significance tests acceptable as I investigated the significance of hypothesized weights.

RESULTS

The results of the regressions are presented in Table 4.3. I will first discuss the lower order effects, before addressing the three-way interaction. In Table 4.3 I see that the main effects of technology uncertainty and buyer dependence are significant (Model 3). Besides, the two-way interaction between technology uncertainty and buyer dependence as well as the two-way interaction between technology uncertainty and supplier dependence are significant. These two interactions are depicted in Figure 4.2a and 4.2b. Both figures clearly show the main effect of technology uncertainty (on 'average' the lines go up): the more technology uncertainty the more supplier involvement. In Figure 4.2a the broken line is 'on average' above the solid line, representing the main effect of buyer dependence: if buyer dependence is higher, supplier involvement is also higher. The two-way interaction depicted in Figure 4.2a shows that the positive relationship between technology uncertainty and supplier involvement is only there when buyer dependence is high ($b = .37$, $p < .01$, when buyer dependence is high ; $b = -.07$, n.s., when buyer dependence is low). Figure 4.2b shows that the positive relationship between technology uncertainty and supplier involvement is only present when supplier dependence is low ($b = .30$, $p < .01$, when supplier dependence is low; $b = .01$, n.s., when supplier dependence is high).

The significant three-way interaction displayed in Figure 4.3 shows that the two-way interactions are conditional ($b = .11$, $p < .05$). This provides support for H1. As can be seen, when the buyer had a large power advantage (i.e. high supplier dependence, low buyer dependence), the supplier was less involved in the decisions of the buyer as technology uncertainty was higher. In other words: under low buyer dependence and high supplier dependence, technology uncertainty was significantly negatively related to supplier involvement

(simple slope: b = -.33, p < .05). This supports H1a. In all other cases, technology uncertainty (TU) was significantly positively associated with supplier involvement (SI) (supporting H1b, c, and d). In case of high buyer dependence and high supplier dependence, technology uncertainty was significantly positively related to supplier involvement (simple slope: b = .34, p < .01). In case of high buyer dependence and low supplier dependence, technology uncertainty was significantly positively related to supplier involvement (simple slope: b = .41, p < .01). In case of low buyer dependence and low supplier dependence, technology uncertainty was significantly positively related to supplier involvement (simple slope: b = .20, p < .05).

Table 4.3: Results of OLS regression (standardized variables) for Supplier Involvement with Technology Uncertainty = TU, Buyer Dependence = BD, Supplier Dependence = SD.

Supplier Involvement

	Model 1		**Model 2**		**Model 3**	
	Estimate	*SE*	*Estimate*	*SE*	*Estimate*	*SE*
Constant	1.89**	0.07	1.84**	0.07	1.82**	0.07
TU	0.21**	0.07	0.20**	0.07	0.15*	0.08
BD	0.15*	0.08	0.19**	0.08	0.19**	0.08
SD	0.13*	0.08	0.08	0.08	0.05	0.08
TU x BD			0.19**	0.07	0.22**	0.07
TU x SD			-0.12	0.07	-0.15*	0.07
BD x SD			0.07	0.07	0.10	0.07
TU x BD x SD					0.11*	0.06
R-squared	*.15***		*.21***		*.23***	
R-squared change	*.15***		*.06**		*.02**	

** significant at p <.01

* significant at p < .05

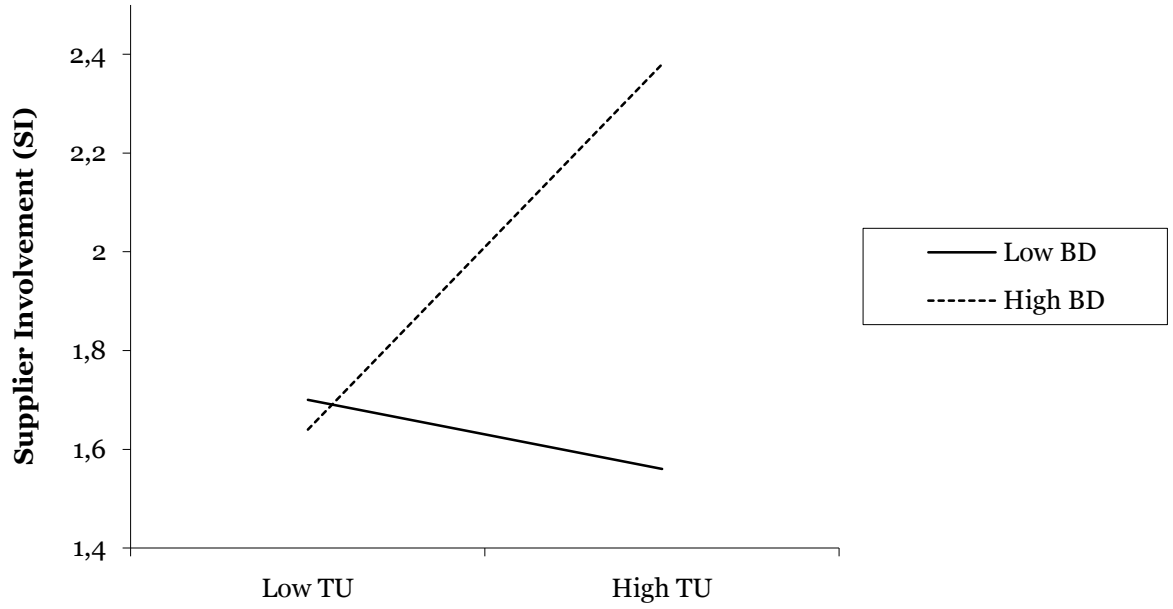

Figure 4.2a: The two-way interaction between Technology Uncertainty (TU) and Buyer Dependence (BD) for Supplier Involvement (SI)

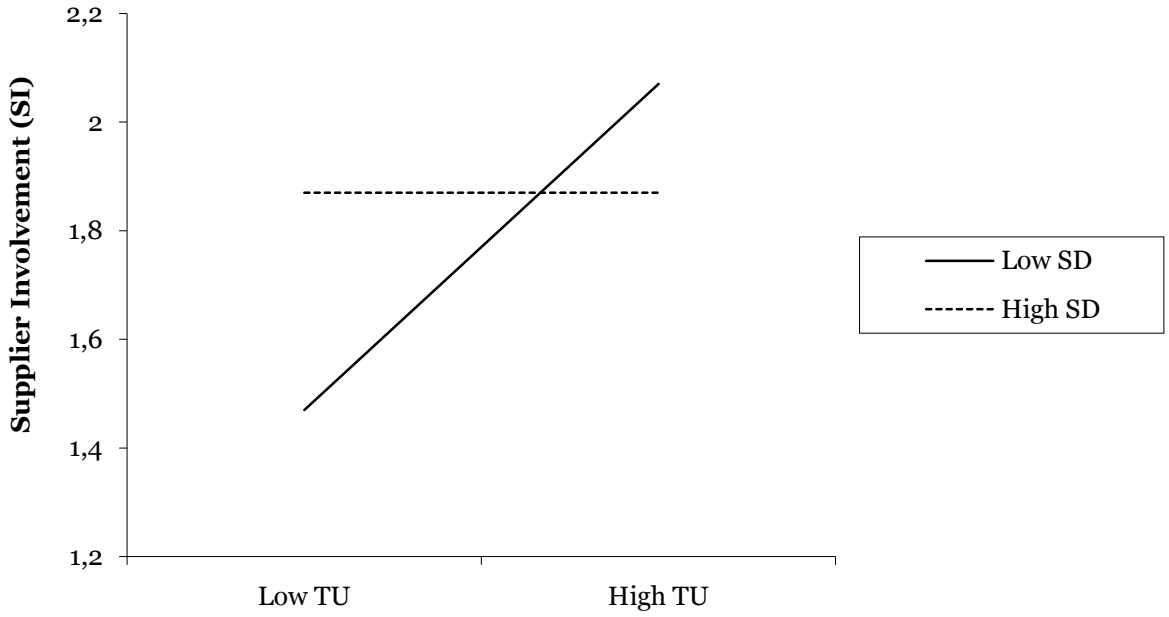

Figure 4.2b: The two-way interaction between Technology Uncertainty (TU) and Supplier Dependence (SD) for Supplier Involvement (SI)

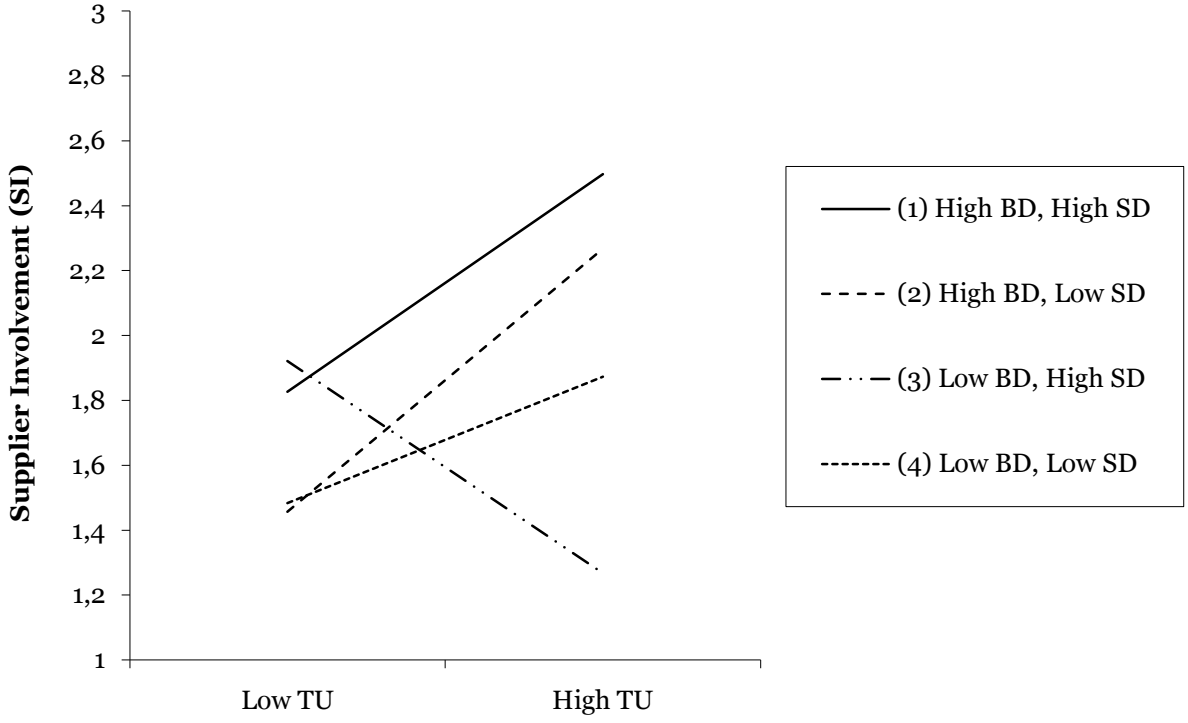

Figure 4.3: The three-way interaction between Technology Uncertainty (TU), Buyer Dependence (BD), and Supplier Dependence (SD) for Supplier Involvement (SI)

DISCUSSION

Past studies indicated that higher levels of technology uncertainty amount to higher levels of supplier involvement. Yet, they did not consider that there are also considerations which could deter buyers from involving suppliers in their decision making as technology uncertainty is higher. In this study, I argued that the resource dependences between buyers and suppliers moderated this relationship. As such, I expected a three-way interaction between technology uncertainty and the resource dependences between buyers and suppliers on supplier involvement. I posed that the relationship between technology uncertainty and supplier involvement is negative when the dependence of the buyer is low and the dependence of the supplier is high (i.e. when the buyer has a power advantage). In all other resource dependence settings, I expected a positive link between technology uncertainty and supplier involvement. I found support for the research framework. I will now discuss the theoretical and practical implications of these findings, and provide suggestions for further research.

Theoretical and practical implications

The study has several implications for theory and business practice.

First, I add to literature on supply chain integration by providing insights into the conditions under which supplier involvement is likely to occur. Prior studies have argued that technology uncertainty disrupts the flow of materials between buyers and suppliers, and that companies engage in integration to counteract this disruption (e.g. Paulraj & Chen, 2007). Yet, these studies insufficiently acknowledged the risks of integration. In this study, I showed that buying firms may oppose penetration of their organizational boundaries through supplier involvement in order to protect their competitive advantage and bargaining position when they are power advantaged. This finding is also practically very relevant; although on one hand practitioners at buying firms have received recommendations to counteract uncertainty by seeking involvement from their suppliers (e.g. Chen & Paulraj, 2004; Paulraj & Chen, 2007; Zhou & Benton, 2007), buyers have also received the advice to have a hands-off approach to their supplier relations to protect their competitive advantage and bargaining position (Frazier et al., 2009; Kraljic, 1983; Mudambi & Helper, 1998; Porter, 1980). The study indicates that the setting in which firms operate matters when determining the extent to which suppliers are involved in the decision making of buyers. In the theory section, I laid out the benefits of supplier involvement but I simultaneously warned for potentially detrimental performance effects of supplier involvement. I reasoned that buying firms would adapt supplier involvement to their setting so as to reap its benefits whilst avoiding its negative performance consequences. While the results indicated that practitioners shape supplier involvement in line with the reasoning, I did not incorporate performance measures and did not compare the performance of firms that adapt to their setting as expected with the performance of firms who do not adapt to their setting. Thus, I can only make observations about the choices that firms make in different settings and not if these choices are beneficial. Yet, the observations which I made seem to make business sense: buyers counteract technology uncertainty by involving suppliers, unless they have a large power advantage which they might want to protect. In this way, the study findings stipulate the trade-off that firms make; on one hand practitioners address technology uncertainty through supplier involvement but on the other hand they are careful to involve suppliers when they have a power advantage which they need to protect. By pointing out this trade-off to practitioners, the study may facilitate decision making regarding the 'right' level of supplier involvement within individual firms. How firms exactly make the aforementioned trade-off and how effective their choice actually is, is an interesting avenue for further research.

Second, the study extends the little empirical literature on how resource dependence theory can be applied to business practice (Pfeffer & Salancik, 2003). Although, as mentioned in the Introduction, there were theoretical indications that technology uncertainty and resource dependences may interact, such effects had not been investigated. The study conceptually showed how these concepts relate to each other and explicitly tested for these interaction effects. I laid out that buying firms are not only dependent on suppliers for primary resources (i.e. components) but that they may also need additional resources such as knowledge and advice from suppliers. I argued that buyers may want to obtain such additional resources to avoid problems caused by technology uncertainty, but also that the process of obtaining additional resources may jeopardize their competitive advantage and bargaining position (i.e. it may unfavorably affect the exchange of primary resources between buyers and other parties). Thus, I offer a broader perspective on resource dependence; I suggest that both tactical considerations (i.e. counteracting technology uncertainty) and strategic considerations (i.e. protecting the competitive advantage and bargaining position) need to be taken into account to explain supplier involvement in business practice. As such, similarly to transaction cost theory (Williamson, 1985), the study emphasizes both the gains from higher buyer-supplier integration but also the threat of opportunism arising from this integration.

Limitations and directions for future research

The study has several limitations and offers several directions for future research.

First, the cross-sectional design of the survey does not make it possible to show causality. Multiple previous studies have argued that technology uncertainty influences supplier involvement (e.g. Chen & Paulraj, 2004; Paulraj & Chen, 2007; Zhou & Benton, 2007), but others have reasoned that supplier involvement may in turn also affect technology uncertainty (Fine, 1998). Furthermore, as argued, supplier involvement may influence the resource dependence setting by binding buyers and suppliers. I would advise future studies to conduct longitudinal research to gain further insights into these issues.

Second, the study may be prone to mono-source bias as I collected the data at a single respondent at the buyer. However, attributing the significant interactions found in this study to the use of single respondents would be difficult (McClelland & Judd, 1993). As the survey responses were gathered at the buyer side, it would be interesting to capture to which extent respondents at the supplier have different perceptions of the concepts measured in this study, and how this affects the outcomes of our study (e.g. Oosterhuis et al., 2013).

Third, it would be beneficial to investigate how resource dependence and supplier involvement affect performance. Do power advantaged buyers who integrate more than their peers as technology uncertainty rises underperform compared to their peers? Does their competitive advantage erode? Are they less able to bargain a high performance from their suppliers? Or are they able to extract so much value from reducing technology uncertainty that this weighs against a potential loss of competitive advantage and bargaining power? And, finally, what are the effects of a lack of supplier involvement throughout the supply chain? As indicated, while these questions may be challenging to study, I believe that it would be very worthwhile to obtain answers to these questions.

Fourth, I focused on the effect of the current resource dependence setting on supplier involvement. It may also be interesting to investigate the effect of the aspired resource dependence setting on supplier involvement. It is possible that buyers want to expand their business to produce some components that they currently purchase from their suppliers. For example, Apple purchased PA Semiconductor in 2008 because they wanted to become leaders in chip development (Brown et al., 2008). Involving suppliers in such cases where buyers want to venture into the business of the suppliers may endanger the aspirations of the buyer (e.g. by driving the firm price up in case of an acquisition or by giving room to a competitor to make a similar strategic move).

Fifth, in this study I focused on one type of integration between buyers and suppliers, namely supplier involvement. It would be beneficial to investigate how resource dependence affects other types of buyer-supplier integration, and how these types jointly affect performance. As suggested by Van der Vaart and Van Donk (2008) attention could be paid to integration attitudes (e.g. trust, common goals, conflict, etc.) and integration practices (e.g. transaction-specific investments).

Conclusion

Concluding, the study theoretically argued and empirically substantiated that the link between supplier involvement and technology uncertainty is moderated by the resource dependences between buyers and suppliers. When the resource dependence of the buyer is low while the resource dependence of the supplier is high (i.e. the buyer has a power advantage), then technology uncertainty has a negative link with supplier involvement. In all other resource dependence settings, technology uncertainty has a positive link with supplier involvement.

CHAPTER 5
Discussion

The reason to conduct this thesis research was to investigate the (power) conditions under which the various aspects of supply chain integration are likely to occur. Although researchers have indicated that power should significantly affect supply chain integration, and that the various aspects of supply chain integration may be affected differently by power, there was insufficient understanding regarding the exact links (Van der Vaart & Van Donk, 2008). In this thesis, I contributed to this discussion by investigating the effects of power on three aspects of supply chain integration. In the next sections I will briefly summarize the results and discuss their theoretical and practical implications. I will end with limitations, suggestions for further research and an overall conclusion.

FINDINGS

Summary of main findings

The main finding of this study is that power significantly affects three aspects of supply chain integration (supply chain governance, investments in transaction specific assets, and supplier involvement). Combined, the findings indicate that firms pursue supply chain integration that serves their interest and that they use their power to achieve this supply chain integration. Due to two factors, I developed a separate line of reasoning regarding the effects of power for each aspect of supply chain integration. First, I argued that the potential impact of each aspect of supply chain integration on firm performance varies. For example, I argued that in specific situations supplier involvement can have serious negative effects on the competitive advantage of the buyer. In comparison, governance and transaction-specific investments have less far-fetching consequences. Second, the interests of buyers and suppliers are not always aligned. For example, I argued that buyers and suppliers may pull at two ends of the same rope when it comes to governance (and supplier performance). Yet, they may have similar interests when it comes to TSAI.

In sum, due to these factors, I expected that the power affects each aspect of supply chain integration differently. As laid out in the previous chapters and summarized again below, the results largely support this reasoning.

Study 1: Supply chain governance

Because literature indicated that relational respectively transactional governance is better suited to meet the interest of the buyer respectively the supplier, the aim of the first study was to investigate if, and how higher power for one of the actors relates to the governance modes and the extent to which they get their interest met. In this study, I opted for the perspective of the buyer and formed hypotheses regarding higher buyer power. These hypotheses can easily be reversed to cover supplier power as, by definition, higher buyer power constitutes in lower supplier power.

I argued that while buyers and suppliers are not necessarily hostile towards each other, they face a basic conflict of interest within their relationship; buyers want to pay the lowest component price for a maximal level of quality, reliability, innovativeness, etc. as this results into the lowest costs and highest revenue generating potential for them, while suppliers want to get the highest component price without making additional efforts to further increase quality, reliability, innovativeness, etc. as this allows them to achieve the highest revenue at the lowest cost. Buyers and suppliers thus prefer supplier performance within the relationship to move into opposite directions (e.g. Blau, 1964; Dore, 1983; Gulati & Sytch, 2007; Perrow, 1970). In order to meet their interest, I argued that firms will impose different governance modes as their power is higher. Literature indicates that relational governance allows buyers to achieve higher supplier performance as it keeps the deliverables within the relationship flexible (Artz, 1999; Bello et al., 2003; Cannon et al., 2000; Ferguson et al., 2005). Transactional governance on the other hand, limits this relational flexibility and helps set clear specifications in terms of supplier performance which is to the benefit of suppliers (Cannon et al., 2000; Ferguson et al., 2005; Lusch & Brown, 1996; Uzzi, 1999). As buyers and suppliers are better able to pursue their interest as they have more power, I reasoned that as buyer power is higher (and supplier power is thus lower), relational governance is higher and transactional governance is lower, and supplier performance is consequently higher.

The results from this study were largely in line with the expectations. The survey findings demonstrated that as buyer power is higher, supplier performance is higher. This effect can be attributed to the governance in the dyad. First, as buyer power is higher, higher levels of relational governance amount in higher supplier performance. Yet, I found that the concept of transactional governance (and its link with supplier performance) is less straightforward. Both in the survey and the case study I found indications that transactional governance constitutes from two components: transactional conflict-governance and transactional contract-governance. In line with the original expectations, the survey results indicated that as buyer power is higher,

lower levels of transactional conflict-governance amount to higher supplier performance. However, as buyer power is higher, levels of transactional contract-governance are lower but this does not significantly affect supplier performance.

The case study helped explain this result. It pointed out that buyers utilize transactional conflict governance to achieve higher supplier performance whenever they have difficulty achieving it through relational governance (i.e. when they do not have sufficient power). Such attempts seem to have a reverse effect on supplier performance than what the buyer intended. Furthermore, the case study indicated that as supplier power is higher, the supplier increasingly utilizes transactional contract-governance to achieve clarity within the relationship. Because contracts do not seem to lower the supplier performance on average, but rather they lower the adaptability of the supplier to prevent dynamism at the buyer to spread to the supplier, it makes sense that I did not find a mediation effect of power on supplier performance through transactional-contract governance in the survey.

Study 2: Investments in transaction specific assets

While investments in transaction specific assets (TSAI) have been acknowledged throughout literature as an important way to reduce disruption uncertainty and to assure the flow of materials from suppliers to buyers, the understanding of when firms engage in TSAI is incomplete (Casciaro & Piskorski, 2005). The aim of the second empirical study presented in this thesis was to better understand the resource dependence setting under which TSAI occur.

I argued that there is a link between power imbalance and TSAI, and that this link is moderated by total dependence. I theorized that when total dependence is high, there are more TSAI as the power imbalance between firms is higher. The reasons for this are that under high total dependence (versus low total dependence) the costs are more likely to weigh against the benefits of TSAI as more value is being created in the relationship, that the powerful firm has needs to protect his bargaining position less, and that the powerful may be more aware of opportunities to create value. Yet when total dependence is low, I expected that there are less TSAI as the power imbalance between firms is higher. In that case, especially the powerful firm has a low interest in securing the flow of materials between them and the other firm.

The results supported the expectations regarding the conditional effects of power imbalance. Yet, I also found that a power advantage for the buyer did not significantly affect TSAI at high levels of total dependence. As such, the results also raised questions why such differences between powerful buyers respectively suppliers occur.

Study 3: Supplier involvement

Literature has recognized that involvement of suppliers in the decision making of buyers can yield significant benefits. However, the understanding about when such supplier involvement occurs is limited. According to various studies, technology uncertainty creates a need for supplier involvement for both the buyer and the supplier. The reason is that technology uncertainty disturbs the flow of materials in the supply chain (e.g. Pfeffer & Salancik, 1978; Chen & Paulraj, 2004). This disturbance can be counteracted by supplier involvement (e.g. Paulraj & Chen, 2007; Zhou & Benton, 2007). Therefore, various authors argue that as technology uncertainty at the buyer is higher, supplier involvement is higher. Yet on the other hand, authors warn that involvement of a less powerful actor in the decision making of a more powerful actor can also have negative consequences (e.g. Frazier et al., 2009; Kraljic, 1983; Porter, 1980). Such involvement can reveal information crucial to the competitive advantage and bargaining position of the power advantaged firm and can as such be damaging to them. Therefore, doubts can be raised whether the expected positive link between technology uncertainty and supplier involvement exists in all power conditions.

In this study, I argued that despite the benefits of supplier involvement, buyers may not always want to involve their suppliers in their decisions as technology uncertainty at the buyer is higher. I posed that in situations where the resource dependence of the buyer on the supplier is low while the resource dependence of the supplier is high (i.e. the buyer has a power advantage), the supplier will be less involved in the decision making of the buyer as technology uncertainty is higher. I argued that in this resource dependence setting the buyer will shield his organization from the supplier and thus protect his competitive advantage and strong bargaining position. In all other resource dependence settings, I expected a positive effect of technology uncertainty on supplier involvement. The results supported the theoretical framework.

IMPLICATIONS AND DIRECTIONS FOR FURTHER RESEARCH

Theoretical and practical implications

Combined, the studies have several theoretical and practical implications.

First, this thesis contributed to the applicability of the most important tenet of resource dependence theory (i.e. power) to business practice. All studies presented in this thesis showed that power is present in buyer-supplier exchanges, and that it significantly influences supply chain integration in a way that primarily meets the interest of the powerful firm. The various chapters of this thesis highlighted different aspects of supply chain integration (i.e. governance,

investments in transaction specific assets, and supplier involvement) and as such the chapters dealt with different aspects of this interest. Chapter 2 demonstrated that as firms have more power, they shape governance to their immediate interest (i.e. to achieve flexibility in the supplier performance if the buyer is more powerful respectively to limit this flexibility if the supplier is more powerful). In chapter 3 and 4, I argued that supply chain integration can have consequences for firms that may not immediately be visible but that could seriously damage their interest nevertheless. In particular, I highlighted the dangers of an eroded competitive advantage and bargaining position. These negative implications closely relate to the power which firms hold within their current relationship, and in the case of competitive advantage may also negatively affect the power of firms within other (potential) relationships.

Second, complementing prior work on supply chain integration, this thesis contributed to the field in two ways. For one, to balance the dominant scientific literature which reports positive performance outcomes of supply chain integration (e.g. Frohlich & Westbrook, 2001; Rosenzweig et al., 2003; Vickery et al., 2003). Theoretically, I highlighted not only the immediately observable benefits of integration but also stipulated the potential negative consequences that may be less visible (in line with e.g. Frazier et al., 2009; Kraljic, 1983; Porter, 1980). Through the studies, which support that the 'downside' of integration is taken into account by firms, I thus hope to have provided a more balanced perspective on the consequences of supply chain integration. Some authors had made an argument for the potentially negative consequences of supply chain integration and had linked these to the resource dependence setting (e.g. Frazier et al., 2009; Kraljic, 1983; Mudambi & Helper, 1998). Yet, this literature only offered a limited theoretical and empirical exploration of the relationship between the disadvantages of integration and the resource dependence setting. Complementing prior literature, the work systematically lays out the benefits and the disadvantages of each aspect of supply chain integration by explicitly linking them to the resource dependence setting. As such, I offer a more detailed, context-driven and thus practically more useful perspective on integration.

In addition, I aim to contribute to the theoretical discussion about what supply chain integration exactly is. Approaching this topic from a resource dependence perspective, this thesis theoretically develops and empirically supports the proposition of Van der Vaart and Van Donk (2008) that supply chain integration is a complex concept, and that the different aspects of supply chain integration cannot be treated uniformly but need to be viewed separately. In this thesis, I investigated the effects of power on 'attitudes', 'practices' and 'patterns' which are the three aspects of supply chain integration as defined by Van der Vaart and Van Donk (2008). As

explained in chapter 1, I focused on key elements of 'attitudes', 'practices' and 'patterns' respectively: governance, investments in transaction specific assets, and supplier involvement. From a buyer perspective, I argued that relational governance allows for flexibility in supplier performance which is in the interest of buyers (who face changing requirements) while transactional governance limits this flexibility which is less in the interest of such buyers. As the buyer has more power, therefore I expected (and showed) that there would be more relational and less transactional governance in the buyer-supplier dyad. Based on theory and the case study, I did not expect firms to consider the potential strategic consequences of governance such as relational lock-in (although they might face such consequences; see e.g. Stevens et al., 2012). Yet, I argued that firms take a more strategic perspective on investments in transaction specific assets and supplier involvement. Both aspects of supply chain integration can pose dangers for the bargaining position of the powerful firm. In addition, supplier involvement in the decision making of the buyer carries the risk that vital processes and the competitive advantage of the buyer are exposed. Therefore, I expected (and found) that investments in transaction specific assets are driven by the power imbalance in the dyad and supplier involvement is affected by the power advantage of the buyer. Overall, the studies thus argued and showed that the different aspects of integration really are different and need to be treated separately when considering the influence of power.

Third, by investigating the role of each aspect of integration within buyer-supplier exchanges I contributed to broader discussions that concern several academic fields and managerial functions. For one, by showing when and why the governance modes are utilized in buyer-supplier exchanges, chapter 2 built upon and complemented existing studies published in general management, marketing and strategy journals (e.g. Cannon et al., 2000; Dwyer et al., 1987; Ferguson et al., 2005; Geyskens et al., 2006; Liu et al., 2009; Macneil, 2000; Morgan & Hunt, 1994; Nevin, 1995; Poppo & Zenger, 2002; Styles & Ambler, 2003). Specifically, the first empirical study adds to the ongoing debate in these fields regarding the roles that the governance modes fulfill and how they relate to each other. Second, by focusing on investments in transaction specific assets made in production by buyers and suppliers, chapter 3 extended the knowledge of what asset specificity in buyer-supplier relationships entails. Prior empirical studies (published in general management and marketing journals) mostly focused on investments in transaction specific assets made only by one party and made in sales rather than in production (e.g. Anderson & Coughlan, 1987; Christiaanse & Venkatraman, 2002; Klein et al., 1990; Zaheer & Venkatraman, 1994). Finally, chapter 4 offered a more strategic perspective on integration and thus complemented (supplier) strategy literature (e.g. Frazier et al., 2009;

Kraljic, 1983; Porter, 1980; Sislian & Satir, 2000; Wathne & Heide, 2000). Building on and extending this literature, I argued and showed that supplier involvement carries substantial strategic risks for power advantaged buyers whose organizational boundaries are penetrated.

Fourth, the study contributes to power literature by showing how power works in a buyer-supplier setting. I argued that firms act as economically rational actors who seek to balance the benefits which are jointly created by themselves and others in the supply chain, with their individual interest in the relationship. As such, in all three studies, I did not stigmatize power as 'bad' nor did I present the powerful as a socially dysfunctional entity or a villain. As explicitly addressed in chapter 2, this opposes various papers in the field of psychology and sociology which have argued that a power advantage triggers negative psychological reactions and destructive behaviors which prohibit actors from integrating due to power abuse and retaliation (e.g. Blau, 1964; Burt, 1980; Cook & Emerson, 1978; Giebels et al., 2000). By arguing an alternative perspective on what power does in a buyer-supplier setting and showing that this perspective holds, the results may guide practitioners on their expectations regarding how other firms react to power.

Limitations and further research

Inherent to all research, the three empirical studies presented in this thesis contain several limitations which are potential weaknesses and offer directions for future research.

First, the use of cross-sectional survey data limits the ability to establish causality between the variables in each study. For example, as laid out in chapter 2, the causality between power, governance and supplier performance can be different than argued. Similarly, chapter 3 indicated that investments in transaction specific assets and resource dependence may have a cyclical relationship. Likewise, chapter 4 indicated that the relationship between supplier involvement and technology uncertainty, and supplier involvement and resource dependence may be more complex than argued. However, if the results of all three studies are combined, the theoretical arguments behind the causal ordering of the models gain in strength; the results consistently support that firms use their power to pursue their interest. As such, a different theoretical perspective with a different causal ordering than proposed in this thesis becomes less likely. Nevertheless, longitudinal research should be conducted to find further evidence for the proposed causal relationships.

Second, the studies could suffer from common source and common method bias as all survey data was gathered from a single respondent at the buyer. An exception to this was the study presented in chapter 2. For that chapter, the case study was a valuable complement to the

survey to gain insights if there were biases and the extent to which these biases would influence the findings. Furthermore, for the studies presented in chapter 3 and 4, it is challenging to attribute the significant interactions to a common source (McClelland & Judd, 1993). In sum, the biases mentioned probably have not affected the results significantly. Nevertheless, it would be helpful if future studies apply multiple sources and methods to fully exclude this possibility. As mentioned previously, investigating differences between the perceptions of suppliers and buyers with regard to the concepts investigated and their relationships may be especially interesting (Oosterhuis et al., 2013).

Third, all studies carry the premise that supply chain decision makers strive to pursue the interest of their firms by utilizing their firms' power. This premise was supported by the results of the three studies. Yet, some caution is in order when interpreting the results and leveraging them to business practice. For example, as laid out in chapter 2, decision makers may differ with regards to the degree to which they pursue their firms' interest effectively. The case study indicated that the buyer which I investigated utilizes transactional-conflict governance to achieve higher supplier performance whenever he does not have sufficient power to get his needs met through relational governance. It seems that the buyer ineffectively used the little power that he had as supplier performance seemed to decrease rather than increase through this strategy. In general, some decision makers may use their power more effectively than others. As the results presented in this thesis are probably based on both effective and less effective decision makers, the results may not fully reflect the supply chain integration that best meets firm interest in each power setting. I would encourage further research on what the 'best' supply chain integration is that firms could achieve with their power.

Fourth, as mentioned in chapter 2, the study results may change when the research framework is leveraged to other industries (e.g. the food industry, or industries that produce raw materials) than those included in the survey and case study. For example, the case study stipulated the importance of relational governance for buyers who need to innovate due to fierce competition. In industries where there is less pressure to innovate, buyers may have less reason to establish relational governance with suppliers. In such cases, decision makers at the buyer may prefer a laissez-faire approach to their supplier relations. An avenue for further research may be to investigate the role of innovation pressure on the preferred governance modes by buyers and suppliers and on the governance they pursue as they have more power.

Fifth, as laid out in previous chapters, the fact that we investigated Dutch manufacturers may influence the results of our study. For one, culture may affect preferences for governance modes (chapter 2). In chapter 3, we argued that investments in transaction specific assets may

depend on the expectations of partners acting opportunistically. In line with the reasoning presented in chapter 2 and 3, it is also possible that decisions to involve suppliers (chapter 4) depend on the culture and economic development of the countries in which firms operate. We would advise future research to investigate how these cultural and economical factors influence the effects of power on the various aspects of supply chain integration.

The findings presented in this thesis also provide several additional opportunities for further research. I showed that power exists in buyer-supplier exchanges and that it significantly influences supply chain integration. By demonstrating the importance of power and the ability to capture its effects, I hope to have laid a foundation for further research on the effects of power in buyer-supplier exchanges. As there are very few studies that investigate these effects empirically and in detail, there are various avenues for further research besides those mentioned in the limitations above.

First, it would be interesting to further deepen the understanding of how power influences the performance that firms achieve due to their exchange with others, and the role of supply chain integration therein. In chapter 2, I partially captured such mechanisms as I argued that power should affect supplier performance through governance. In chapter 3 and 4, I brought forward several considerations why firms should not integrate: the costs and the risk of a deteriorated bargaining position and a decreased competitive advantage. I argued that firms would avoid certain supply chain integration (i.e. supplier involvement and investments in transaction specific assets) to circumvent such negative outcomes. It would be interesting to investigate if firms who deviate from the expectations indeed face such severe consequences.

Second, it would be interesting to capture the dynamics between the resource dependence setting and supply chain integration. Is there a cyclical relationship between these concepts, and if so, how can it best be described? I mentioned this issue in chapter 3 for investments in transaction specific assets, but a cyclical relationship could also be expected for the other two aspects of integration. For example, prior studies have indicated that prolonged relational governance may lock-in a buyer into the exchange with the supplier; in other words, the perceived resource dependence setting may change due to such integration (e.g. Stevens et al., 2012). It would be interesting to investigate these dynamics for all aspects of integration in more detail in a longitudinal study.

Finally, on a more meta-analytical level, while formulating the line of reasoning I noticed that the opinion of scientists regarding power and its effects seems strongly shaped by their moral beliefs. While Emerson (1962) states that the powerful should receive higher benefits within the exchange with the less powerful because he adds more to the exchange, there are

many authors that stipulate that an imbalanced distribution of benefits between parties which favors the powerful party is 'unfair'. For example, Gulati and Sytch (2007) state that "the performance benefits of the stronger, dependence-advantaged party are expected to come *at the expense* of the weaker, dependence-disadvantaged party (e.g. Aldrich, 1979; Cook, 1977; Kim et al., 2004; Pfeffer & Salancik, 1978)". Starting from the position that firms are entitled to an equal share, most authors build a line of reasoning and search for evidence which supports a struggle of the powerful and less powerful firm which leads to performance detriment for both. I believe that past studies on the effects of power have insufficiently taken into account that firms are economic actors who engage in *voluntary* bilateral transactions (Friedman, 1962). Based on the premise that firms are able and willing to pursue their economic self-interest by engaging in exchanges with others, in this thesis I presented and empirically substantiated an alternative viewpoint regarding the effects of power. As such, I hope to inspire future researchers to question the assumption of purposeful economic destruction between firms due to power. It would be interesting to know what future studies would find if academics would not search for evidence for 'injustice' and 'destruction' caused by power (e.g. Piskorski & Casciaro, 2006) but would formulate hypotheses based on the assumption that firms use their power in an economically rational way.

CONCLUDING REMARKS

The results presented in this thesis clearly showed that power is an important factor in buyer-supplier exchanges. I argued that different perspectives on power and different functions of power are appropriate when investigating different aspects of supply chain integration. I showed that buyer power, power imbalance, or the power advantage of a specific firm can all be relevant. Combined, the findings contribute to the understanding of both scientists and practitioners when and why supply chain integration is likely to occur. Simultaneously, I indicated that a lot of research still needs to be done, especially regarding the utilization of power by decision makers and the consequent performance implications for the firms in the supply chain. The reasoning presented in this dissertation laid out the logic behind these effects and thus provides a good starting point for such future work.

APPENDIX

MEASURES OF DEPENDENCE IN ALL THREE STUDIES

Wording of Question Headings: "Please indicate if the following statements apply to the relationship between your plant and this supplier." Possible answers: "1=completely disagree, 2=disagree, 3=neither disagree nor agree, 4=agree, 5=completely agree". Unless indicated otherwise, all statements were presented to the respondents in the same order.

Dependence

Dependence of the buyer on the supplier

BD1: It would require much trouble and expense for us to switch to another supplier.

BD2: For the components which we procure from this supplier, there are enough other potential suppliers to ensure adequate competition among the current suppliers.

BD3: There are satisfactory alternative sources of short-term supply available for these components.

BD4: We would face serious production problems if this supplier stopped supplying these components to us.

Dependence of the supplier on the buyer

SD1: If we withdrew our business from this supplier, it would require much trouble and expense for them to find other buyers.

SD2: For the components which we procure from this supplier, this supplier can find enough other potential buyers to get an adequate price.

SD3: On the short-term, there are satisfactory alternative buyers available for this supplier's components.

SD4: This supplier would face a serious financial crisis if we withdrew our business from them.

CONSTRUCTS AND SCALE ITEMS SPECIFIC TO CHAPTER 2

Wording of Question Headings: "Please indicate if the following statements apply to the relationship between your plant and this supplier." Possible answers: "1=completely disagree, 2=disagree, 3=neither disagree nor agree, 4=agree, 5=completely agree". Unless indicated otherwise, all statements were presented to the respondents in the same order.

Governance

Description	**Items**
Benevolence Expectations of a party in the good and altruistic intentions of its partner to provide value to them. Firms can look after the best interest of their partner by being honest and open about issues that might be of concern to their partner, and by helping them in ways that are not required under their agreement (e.g. Ganesan, 1994; Miyamoto & Rexha, 2004; Sako & Helper, 1998). The items were adapted from Miyamoto and Rexha (2004).	TB1: We can rely on this supplier to help us in ways not required by our agreement with them.** TB2: We believe that this supplier would make sacrifices for us to support us. TB3: This supplier can rely on us to help them in ways not required by their agreement with us. TB4: We would make sacrifices for this supplier to support them.
The pursuit of common goals The belief that firms' goals are positively related so that as one actor moves toward goal attainment, others will also reach their goals. The success of one implies the success of the other. The scale was based on the classic dichotomy of Deutsch (Deutsch, 1949; Deutsch, 1973; Deutsch, 1980; Deutsch, 1990) and the items were adapted from the scales of Alper et al. (1998).	CMG1: This supplier and we want each other to succeed. CMG2: This supplier and we seek compatible goals. CMG3: When this supplier and we work together, we usually have common goals.

Joint evaluation The degree to which firms jointly evaluate if they attain their goals, reflects the active enforcement of collaborative efforts (e.g. Cooper et al., 1997). The items were adapted from Van der Vegt et al. (2003).	JE1: Our plant and this supplier evaluate our joint performance. JE2: Our plant and this supplier regularly evaluate how good or bad we perform together. JE3: When we do not perform well, we are jointly responsible.
Formalization of the relationship through explicit contracting The interference in collaborative endeavors by codification and enforcement of inputs, outcomes and inter-organizational activities. The items were adapted from Sako and Helper (1998).	TC1: We prefer to have everything spelt out in detail in the contract with this supplier. TC2: This supplier prefers to have everything spelt out in detail in the contract with us.
Existence of conflicting goals One firm's goal attainment reduces the chance that the other will attain their goals. The success of one party results in the failure of others. The scale was based on the classic dichotomy of Deutsch (Deutsch, 1949; Deutsch, 1973; Deutsch, 1980; Deutsch, 1990) and was adapted from the scales of Alper et al. (1998).	CFG1: This supplier structures things in ways that favor their goals rather than our goals.** CFG2: This supplier and we have a win-lose relationship. CFG3: This supplier and we like to show that we are superior to each other. CFG4: This supplier's goals are incompatible with our goals.

** = item was removed due to insufficient factor loading

Supplier performance

Wording of Question Headings: "How has this supplier's performance to your plant evolved relative to three years ago? In case the relationship with this supplier is shorter than three years, please refer to the change in performance of this supplier to your plant since the start of the relationship." Possible answers: 1=significantly worsened, 2=worsened, 3=remained equal (no change), 4=improved, 5=significantly improved. The items are based on Gulati & Sytch (2007) and Slack and Lewis (2002).

SP1: Price competitiveness
SP2: Negotiated price versus target price
SP3: Component quality
SP4: Average defect rate
SP5 Component customization ability
SP6: Component innovation
SP7: On-time delivery
SP8: Delivery reliability / dependability
SP9: Responsiveness
SP10: Component volume flexibility
SP11: Component mix flexibility
SP12: Service and support

CONSTRUCTS AND SCALE ITEMS SPECIFIC TO CHAPTER 3

Investments in transaction specific assets

Investments in transaction specific assets made by buyer

Wording of Question Headings: "Please indicate the amount of investment which your plant made to strengthen the relationship with this supplier for each of the following areas." Possible answers: "1=not involved at all, 2=slightly involved, 3=moderately involved, 4=involved, 5=involved to a great extent". The items were developed by considering literature that reports on investments in tangible assets, production practices and labor which jointly form the production systems of buyers and suppliers (De Toni, 1999; Dong et al., 2001; Frohlich & Westbrook, 2001; Kulp et al., 2004), and investments in the information systems which support these production systems (Bagchi et al., 2005; Frohlich & Westbrook, 2001; Kulp et al., 2004; Moberg et al., 2004; Ramdas & Spekman, 2000). Furthermore, I considered the items (that dealt with investments) that were reported in the various papers considered in the review of Van der Vaart and Van Donk (2008).

TSAIB1: Information systems (Hardware/software to improve your information sharing capability with this supplier)
TSAIB2: Implementation of production practices (Pull system, Cellular manufacturing, Cycle time reduction, Bottleneck/constraint removal)
TSAIB3: Training of existing personnel (production, R&D, etc)
TSAIB4: Appointing new personnel (production, R&D, etc)
TSAIB5: Equipment, machines and tools for production, packaging, storage, transportation
TSAIB6: Facilities for production and storage (buildings and warehouses)

Investments in transaction specific assets made by supplier

Wording of Question Headings: "Please indicate the amount of investment which this supplier made to strengthen the relationship with your plant for each of the following areas." Possible answers: "1=not involved at all, 2=slightly involved, 3=moderately involved, 4=involved, 5=involved to a great extent".

TSAIS1: Information systems (Hardware/software to improve this supplier's information sharing capability with your plant)

TSAIS2: Implementation of production practices (Pull system, Cellular manufacturing, Cycle time reduction, Bottleneck/constraint removal)

TSAIS3: Training of existing personnel (production, R&D, etc)

TSAIS4: Appointing new personnel (production, R&D, etc)

TSAIS5: Equipment, machines and tools for production, packaging, storage, transportation

TSAIS6: Facilities for production and storage (buildings and warehouses)

CONSTRUCTS AND SCALE ITEMS SPECIFIC TO CHAPTER 4

Wording of Question Headings for Technology Uncertainty: "Please indicate if the following statements apply to the relationship between your plant and this supplier." Possible answers: "1=completely disagree, 2=disagree, 3=neither disagree nor agree, 4=agree, 5=completely agree". The items were based on Chen and Paulraj (2004) and Zhou and Benton (2007).

Technology Uncertainty

TU1: New products account for a high fraction of total revenue. **
TU2: Products and services are innovated frequently.
TU3: The innovation rate of operating processes is high.
TU4: These products are characterized by rapidly changing technology.
TU5: If we don't keep up with changes in technology, it will be difficult for us to remain competitive.
TU6: Production processes quickly become outdated for these products.
TU7: The production technology changes frequently and sufficiently.
** = item was removed due to insufficient factor loading

Wording of Question Headings for Supplier Involvement: "Please indicate this supplier's involvement in your plant's decision making about the products of your plant which contain components that this supplier supplies to you." Possible answers: "1=not involved at all, 2=slightly involved, 3=moderately involved, 4=involved, 5=involved to a great extent". The items were based on Gulati & Sytch (2007).

Supplier Involvement

DI1: Initial product design
DI2: Product modification
DI3: Initial production process design
DI4: Production process modification
DI5: Production process planning
DI6: Quality improvement
DI7: Cost control

SUMMARY

Modern economies are based on the sequential distribution of tasks between firms. In this division of tasks, every company adds value to a semi-finished product and sells it to the next firm until a final consumer product is realized. Literature refers to such networks of firms as supply chains. To improve the flow of materials between the various firms in a supply chain, academics frequently stipulate that there is a need for integration between them. Yet, there is insufficient understanding when and why integration actually arises and what its (potential) outcomes are for the integrating firms.

In this thesis, I investigate the link between power and integration. While power has been distinguished as a factor essential to supply chain integration, there is little empirical work exploring this link (e.g. Casciaro & Piskorski, 2005; Gulati & Sytch, 2007). Furthermore, while there are different aspects to integration, most literature treats integration as a uni-dimensional concept (Van der Vaart & Van Donk, 2008). As such it is poorly understood how the various aspects of integration are affected by the power conditions under which firms operate. This thesis aims to increase the understanding of this link.

In **chapter 1**, I provide an overview of literature on supply chain integration. Based on the classification of Van der Vaart and Van Donk (2008), I distinguish three aspects of supply chain integration: attitudes, practices and patterns. “Attitudes” reflect how buying and supplying firms feel about each other or towards supply chain integration in general. Integration is high when there are for example common goals and there is the expectation of long term relationships. “Patterns” refer to interaction patterns between the focal firm and its suppliers and/or customers. Integration is high when firms have for example high corporate level communication on important issues with key suppliers. “Practices” are tangible activities or technologies that facilitate the exchange between a focal firm with its suppliers and / or customers. Integration is high when firms have for example invested in Electronic Data Interchange (EDI) and Vendor Managed Inventories (VMI).

Based on literature, I argue that supply chain integration should not always be high as implicitly or explicitly assumed in many studies, but that the power conditions determine which level of supply chain integration meets the interest of (one of) the involved firms. Building on resource dependence theory (Pfeffer & Salancik, 1978), I reason that the degree to which the buyer needs the resources of the supplier (i.e. the resource dependence of the buyer) and vice versa (i.e. the resource dependence of the supplier) are relevant to the integration which is observed in business practice. The difference in these resource dependences is popularly known

as ‘power’ (Emerson, 1962; Pfeffer, 1972; Pfeffer & Salancik, 1978). Power gives the less dependent firm the ability to structure the exchange of resources with the more dependent firm as it likes (e.g. Burt, 1983; Emerson, 1962; Friedkin, 1986; Lawler & Bacharach, 1987; Pfeffer & Salancik, 1978; Pfeffer & Leong, 1977; Piskorski & Casciaro, 2006; Porter, 1980; Provan et al., 1980; Van de Ven et al., 1976). While various researchers acknowledge that power should have a great impact on supply chain integration (and performance) in buyer-supplier exchanges, little empirical work has been conducted to investigate its exact effects (Casciaro & Piskorski, 2005; Pfeffer & Salancik, 2003).

I highlight that different perspectives on power exist in literature: the power of one firm relative to the other firm, the power advantage of one specific firm, and the power imbalance between two firms. I argue that a different perspective on power is necessary depending on which aspect of supply chain integration is investigated. Furthermore, I reason that power can fulfill a different role, depending on the aspect of integration under consideration; either the direct effect of power is relevant, or the moderated effect, or power itself can function as a moderator. In the remainder of chapter 1, I discuss which perspective and role of power is appropriate for each aspect of supply chain integration.

In **chapter 2**, I investigate how power affects governance (which is a key part of ‘attitudes’) between buyers and suppliers. As elaborated in more detail in chapter 2, literature distinguishes two types of supply chain governance: relational and transactional governance. I argued that relational governance is more suited to meet buyer interests and transactional governance is more suited to meet supplier interests. Therefore, I expected that as the power of the buyer is higher, relational governance is higher and transactional governance is lower. Consequently, I expected that supplier performance is higher. Using survey data from 125 buyer-supplier exchanges, and a case study of a NASDAQ listed buyer and its key suppliers, I tested these hypotheses.

The results from this study were largely in line with the expectations. The survey findings demonstrated that as buyer power is higher, supplier performance is higher. This effect can be attributed to the governance in the dyad. First, as buyer power is higher, higher levels of relational governance amount in higher supplier performance. Yet, I found that the concept of transactional governance (and its link with supplier performance) is less straightforward. Both in the survey and the case study I found indications that transactional governance constitutes from two components: transactional conflict-governance and transactional contract-governance. In line with the original expectations, the survey results indicated that as buyer power is higher, lower levels of transactional conflict-governance amount to higher supplier performance.

However, as buyer power is higher, levels of transactional contract-governance are lower but this does not significantly affect supplier performance.

The case study helped explain this result. It pointed out that buyers utilize transactional conflict governance to achieve higher supplier performance whenever they have difficulty (i.e. when they do not have sufficient power) to achieve relational governance and subsequent higher supplier performance. Such attempts seem to have a reverse effect on supplier performance than what the buyer intended. Furthermore, the case study indicated that transactional-contract governance is not meant to decrease supplier performance. As supplier power is higher, the supplier increasingly utilizes it to achieve clarity within the relationship. As such, it makes sense that no mediation effect of power on supplier performance through transactional-contract governance was found.

In **chapter 3**, I investigated how power relates to supply chain practices. I focused on one specific practice, i.e. investments in transaction specific assets (TSAI) in the production systems of buyers and suppliers. While such investments in transaction specific assets have been acknowledged as an important way to improve the flow of resources between buyers and suppliers, the understanding of when firms engage in production-related TSAI is incomplete. The aim of the second empirical study presented in this thesis was to better understand the resource dependence setting under which such TSAI occur.

I argued that there is a link between power imbalance and TSAI, and that this link is moderated by total dependence. I theorized that when total dependence is high, there are more investments in transaction specific assets as the power imbalance between firms is higher. The reasons for this are that under high total dependence (versus low total dependence) the costs are more likely to weigh against the benefits of TSAI as more value is being created in the relationship, that the powerful firm has needs to protect his bargaining position less, and that the powerful may be more aware of opportunities to create value. Yet when total dependence is low, I expected that there are less TSAI as the power imbalance between firms is higher. In that case, especially the powerful firm has a low interest in securing the flow of materials between them and the other firm. I investigated if the expectations hold based on survey data from 125 buyer-supplier exchanges.

The results supported the expectations regarding the conditional effects of power imbalance. Yet, opposing expectations, a power advantage for the buyer did not significantly affect investments in transaction specific assets at high levels of total dependence. As such, the results also raised questions if there might be differences in TSAI under powerful buyers versus powerful suppliers.

In **chapter 4**, I studied the link between power and patterns. I chose to focus on a specific pattern, namely the involvement of suppliers in the decision making of buyers. Literature has recognized that such supplier involvement can yield significant benefits. However, the understanding about when such supplier involvement occurs is limited. According to various studies, technology uncertainty creates a need for supplier involvement for both the buyer and the supplier. The reason is that technology uncertainty disturbs the flow of materials in the supply chain. This disturbance can be counteracted by supplier involvement. Therefore, various authors argue that as technology uncertainty at the buyer is higher, supplier involvement is higher. Yet on the other hand, authors warn that supplier involvement of a less powerful actor in the decision making of a more powerful actor can also have negative consequences. Such involvement can reveal information crucial to the competitive advantage and strong bargaining position of the power advantaged firm, and can thus be damaging to them. Therefore, doubts can be raised whether the expected positive link between technology uncertainty and supplier involvement exists in all power conditions.

In this study, I argued that despite the benefits of supplier involvement, buyers may not always want to involve their suppliers in their decisions as technology uncertainty at the buyer is higher. I posed that in situations where the resource dependence of the buyer on the supplier is low while the resource dependence of the supplier is high, the supplier will be less involved in the decision making of the buyer as technology uncertainty is higher. I argued that in this resource dependence setting the buyer will shield his organization from the supplier and thus protect his competitive advantage and strong bargaining position. In all other resource dependence settings, I expected a positive effect of technology uncertainty on supplier involvement. To test the hypotheses, I used survey data from 125 buyer-supplier relationships. The results supported the theoretical framework.

Finally, in **chapter 5**, I summarize and discuss the findings of all three empirical studies. Combined, the findings indicate that firms use their power to shape supply chain integration to serve their interest. On one hand, they seek to reap the benefits from streamlining the flow of resources in the supply chain through integration. On the other hand, they simultaneously take into consideration its costs and risks. As the three supply chain integration aspects differ regarding their benefits, costs and risks, I developed a separate line of reasoning how power relates to each supply chain integration aspect. As laid out in the previous chapters, the results support this reasoning.

The findings have implications for both theory and business practice. I showed that the various aspects of integration can be explained by power or, in other words, that integration

serves the interest of the powerful. As such, this thesis empirically demonstrated that power plays an important role in buyer-supplier exchanges and needs to be acknowledged by scholars and practitioners alike. This thesis furthermore contributed to supply chain integration literature and practitioner understanding by highlighting not only the benefits of integration but also stipulating the various costs and risks of the different aspects of integration. Overall, by highlighting not just the positive side of integration but also its costs and risks per integration aspect, I argued and showed two things. First, I showed that each integration aspect should be considered separately as the aspects differ with regards to their benefits, costs, and risks. Second, I demonstrated that in general caution is warranted regarding supply chain integration as it does not just entail benefits but can also harm the interest of firms.

While I hope that this thesis enhanced the existing knowledge regarding the link between power and the various aspects of supply chain integration, there are many avenues for further research. For example, it would be interesting to further deepen the understanding of how power influences the performance that firms achieve due to their exchange with others, and the role of supply chain integration therein. Furthermore, I would encourage research which further investigates the 'optimal' supply chain integration in a certain (power) context, if and why (powerful) decision makers deviate from this optimum, and what the consequences are for the involved firms.

SAMENVATTING

Hedendaagse economieën zijn gebaseerd op de sequentiële verdeling van taken tussen bedrijven. Bij een dergelijke verdeling van taken voegt elk bedrijf waarde toe aan een halffabricaat en verkoopt het door aan een volgend bedrijf totdat een product ontstaat dat gereed is voor de eindconsument. De literatuur noemt zulke netwerken van bedrijven waarde ketens (i.e. 'supply chains').

Academici benadrukken vaak dat bedrijven die onderdeel uitmaken van een waardeketen moeten integreren om de middelenstroom tussen hen te verbeteren. Echter is er onvoldoende begrip wanneer en waarom ketenintegratie daadwerkelijk ontstaat, en wat de (mogelijke) consequenties zijn voor de integrerende bedrijven.

In dit proefschrift onderzoek ik de link tussen een belangrijke contextuele factor (i.e. macht) en ketenintegratie. Terwijl macht is erkend als factor die van grote invloed kan zijn op integratie tussen bedrijven in een waardeketen, is er maar weinig empirisch werk dat deze link onderzoekt (bijv. Casciaro & Piskorski, 2005; Gulati & Sytch, 2007). Daarnaast wordt integratie vaak als eendimensionaal begrip behandeld terwijl er veel verschillende aspecten van ketenintegratie zijn (Van der Vaart & Van Donk, 2008). Al met al begrijpen we dus onvoldoende hoe macht de verschillende aspecten van ketenintegratie beïnvloedt, ondanks dat we weten dat dit een belangrijk vraagstuk is. Dit proefschrift probeert het begrip hieromtrent te vergroten.

In **hoofdstuk 1** geef ik een overzicht van literatuur over ketenintegratie. Gebaseerd op de classificatie van Van der Vaart en Van Donk (2008), onderscheid ik drie aspecten van ketenintegratie: opvattingen, praktijken en patronen. 'Opvattingen' geven weer hoe kopende en leverende bedrijven over elkaar en ketenintegratie denken. Integratie is hoog als men vindt dat er bijvoorbeeld gemeenschappelijke doelen zijn en men elkaar vertrouwt. 'Patronen' verwijzen naar interactieve patronen tussen een bedrijf en zijn leveranciers en/of klanten. Integratie is bijvoorbeeld hoog als bedrijven op hoog managementniveau met leveranciers overleggen over strategische zaken. 'Praktijken' zijn tastbare activiteiten of technologieën die de uitwisseling van middelen tussen een bedrijf en zijn leveranciers en / of klanten faciliteren. Integratie is hoog als bedrijven geïnvesteerd hebben in bijvoorbeeld elektronische data uitwisselingssystemen (i.e. 'Electronic Data Interchange, EDI') of voorraadbeheer door de leverancier (i.e. 'Vendor Managed Inventories, VMI').

Gebaseerd op literatuur, betoog ik dat ketenintegratie niet altijd hoog moet zijn zoals dikwijls impliciet of expliciet door onderzoekers verondersteld wordt. Ik beargumenteer dat de machtscondities bepalen welk niveau van ketenintegratie de interesse dient van (één van) de

betrokken bedrijven. Voortbouwend op 'middelen afhankelijkheidstheorie' (i.e. 'resource dependence theory', Pfeffer & Salancik, 1978), redeneer ik dat de mate waarin de koper de middelen van de leverancier nodig heeft (i.e. de middelen afhankelijkheid van de koper) en vice versa (i.e. de middelen afhankelijkheid van de leverancier) relevant zijn voor de ketenintegratie die in de praktijk wordt waargenomen. Het verschil in deze middelen afhankelijkheden staat algemeen bekend als 'macht' (Emerson, 1962; Pfeffer, 1972; Pfeffer & Salancik, 1978). Macht geeft het minder afhankelijke bedrijf de mogelijkheid om de uitwisseling van middelen met het meer afhankelijke bedrijf in zijn belang te structureren (bijv. Burt, 1983; Emerson, 1962; Friedkin, 1986; Lawler & Bacharach, 1987; Pfeffer & Salancik, 1978; Pfeffer & Leong, 1977; Piskorski & Casciaro, 2006; Porter, 1980; Provan et al., 1980; Van de Ven et al., 1976). Terwijl verschillende onderzoekers erkennen dat macht een grote invloed zou moeten hebben op integratie (en de prestaties van bedrijven) in waardeketens, is er weinig empirisch onderzoek gedaan naar de precieze effecten (Casciaro & Piskorski, 2005; Pfeffer & Salancik, 2003).

Ik belicht dat er verschillende perspectieven op macht bestaan in de literatuur: de macht van één bedrijf relatief tot het andere bedrijf, het machtsvoordeel van een specifiek bedrijf, en het machtsverschil tussen twee bedrijven. Ik betoog dat een verschillend perspectief op macht van toepassing is afhankelijk van het aspect van ketenintegratie dat onderzocht wordt. Verder redeneer ik dat macht een verschillende rol kan vervullen afhankelijk van het aspect van ketenintegratie dat onderzocht wordt; het directe effect van macht kan relevant zijn, of het gemodereerde effect, of macht kan zelf als moderator dienen. In de rest van hoofdstuk 1, bediscussieer ik welk perspectief en welke rol van macht toepasselijk is voor elk aspect van ketenintegratie.

In **hoofdstuk 2**, onderzoek ik hoe macht de 'opvattingen' in waardeketens beïnvloedt. In dit proefschrift focus ik mij op een belangrijk deel van opvattingen, namelijk 'ketenbestuur'. Zoals ik in meer detail in hoofdstuk 2 beschrijf, worden er in de literatuur twee soorten ketenbestuur onderscheiden: relationeel en transactioneel ketenbestuur. Ik redeneer dat relationeel ketenbestuur beter geschikt is om het belang van de kopende partij binnen de relatie na te streven. Transactioneel ketenbestuur is beter geschikt om het belang van de leverende partij na te streven. Daarom verwacht ik dat als de koper meer macht heeft (en de leverancier bij definitie minder macht heeft), er meer relationeel ketenbestuur is en minder transactioneel ketenbestuur. Ik verwacht als gevolg hiervan dat de prestatie van de leverancier in de relatie met de koper hoger is. Gebruik makend van enquêtegegevens van 125 koper-leveranciersrelaties, en een kwalitatieve studie bij een NASDAQ genoteerde koper en zijn belangrijkste leveranciers, test ik deze hypotheses.

De resultaten van deze studie liggen hoofdzakelijk in lijn met onze verwachtingen. Onze enquête resultaten laten zien dat als de koper meer macht heeft, de prestatie die hij van de leverancier krijgt stijgt. Dit effect kan toegekend worden aan het ketenbestuur tussen de koper en de leverancier. Ten eerste zorgt, als de koper meer macht heeft, een hoger niveau aan relationeel ketenbestuur voor hogere leverancierspresta ties. Echter is de rol van transactioneel ketenbestuur (en zijn link met leverancierspresta ties) minder eenvoudig. Zowel in de enquête als in de kwalitatieve studie vind ik indicaties dat transactioneel ketenbestuur uit twee componenten bestaat: transactioneel conflict-gebaseerd ketenbestuur en transactioneel contract-gebaseerd ketenbestuur. In lijn met onze originele verwachtingen laten onze enquêteresultaten zien dat als de koper meer macht heeft, transactioneel conflict-gebaseerd ketenbestuur lager is wat leidt tot hogere leverancierspresta ties. Echter is het zo dat als de koper meer macht heeft, transactioneel contract-gebaseerd ketenbestuur hoger is maar dat dit niet significant leidt tot hogere leverancierspresta ties.

De kwalitatieve studie helpt bij het verklaren van dit resultaat. De bevindingen van deze studie wijzen erop dat kopers transactioneel conflict-gebaseerd ketenbestuur inzetten om hogere leverancierspresta ties te bereiken als ze moeilijkheden hebben om deze door hoger relationeel ketenbestuur te bereiken (i.e. als ze onvoldoende macht hebben). Zulke pogingen lijken helaas een omgekeerd effect op de leverancierspresta ties te hebben dan wat de koper ermee beoogt. Verder geeft de kwalitatieve studie aan dat transactioneel contract-gebaseerd ketenbestuur niet bedoeld is om leverancierspresta ties te verlagen. Naarmate de leverancier meer macht heeft, zet deze zijn macht toenemend in om middels contracten duidelijkheid binnen de relatie te bereiken. Als zodanig is het begrijpelijk dat er geen gemedieerd effect van macht op leverancierspresta ties door transactioneel contract-gebaseerd ketenbestuur bestaat.

In **hoofdstuk 3** onderzoek ik hoe macht zich verhoudt tot 'praktijken' in waardeketens. Ik spits me toe op één specifieke praktijk, namelijk transactie specifieke investeringen (TSI). Terwijl transactie specifieke investeringen door de literatuur zijn erkend als een belangrijke manier om de stroom van middelen tussen kopende en verkopende bedrijven te verbeteren, begrijpen we onvoldoende wanneer bedrijven aan TSI doen. Het doel van de tweede empirische studie in dit proefschrift is om beter te begrijpen onder welke middelen afhankelijkheidscondities TSI tot stand komen.

Ik redeneer dat er een link is tussen het machtsverschil tussen bedrijven en TSI, en dat deze link gemodereerd wordt door 'totale afhankelijkheid' (i.e. de som van middelen afhankelijkheden van koper en verkoper). Ik theoretiseer dat als de totale afhankelijkheid hoog is, er meer transactie specifieke investeringen zijn als het machtsverschil tussen bedrijven hoger

is. De redenen hiervoor zijn dat onder hoge totale afhankelijkheid (versus lage middelen afhankelijkheid) de baten eerder opwegen tegen de kosten van TSI omdat er meer waarde gecreëerd wordt in de relatie, dat het machtige bedrijf minder behoefte heeft om zijn onderhandelingspositie te beschermen, en dat het machtige bedrijf zich meer bewust is van mogelijkheden om waarde te creëren binnen de relatie. Als de totale afhankelijkheid echter laag is, verwacht ik dat er minder TSI tussen kopers en leveranciers zijn als het machtsverschil tussen bedrijven hoger is. In dat geval heeft in het bijzonder het machtige bedrijf weinig belang om de uitwisseling van middelen tussen hem en het andere bedrijf te verbeteren. Ik onderzoek of onze verwachtingen kloppen met behulp van enquêtedata van 125 koper-leveranciersrelaties.

Onze resultaten bevestigen de verwachtingen met betrekking tot het voorwaardelijke effect van machtsverschil. Echter is een machtsvoordeel voor de koper niet significant gerelateerd tot TSI wanneer totale afhankelijkheid hoog is. Als zodanig werpt dit resultaat de vraag op of er verschillen in TSI zouden kunnen zijn tussen machtige kopers en machtige leveranciers.

In **hoofdstuk 4** bestudeer ik de link tussen macht en 'patronen'. Ik kies ervoor om me op een specifiek patroon te richten, namelijk de betrokkenheid van leveranciers in de besluitvorming van kopers. De literatuur heeft erkend dat zulke beslissingsbetrokkenheid grote voordelen kan opleveren. Echter is ons begrip wanneer dergelijke beslissingsbetrokkenheid optreedt beperkt. Volgens verschillende studies creëert technologische onzekerheid een wenselijkheid tot beslissingsbetrokkenheid voor zowel de koper als de verkoper. De reden is dat technologische onzekerheid de stroom van materialen in de waardeketen verstoort. Deze verstoring kan door beslissingsbetrokkenheid tegengegaan worden. Daarom redeneren meerdere auteurs dat beslissingsbetrokkenheid hoger is als technologische onzekerheid hoger is. Anderzijds waarschuwen wetenschappers ook dat beslissingsbetrokkenheid van een minder machtig bedrijf in het besluitvormingsproces van een machtiger bedrijf ook negatieve consequenties voor het machtige bedrijf kan hebben. Zulke beslissingsbetrokkenheid kan informatie aan het licht brengen die cruciaal is voor het competitieve voordeel en de sterke onderhandelingspositie van het machtige bedrijf en kan daardoor het bedrijfsbelang schaden. Daarom kunnen vraagtekens gezet worden of de verwachte positieve link tussen technologische onzekerheid en beslissingsbetrokkenheid bestaat in alle machtscondities. Om alle hypotheses te testen, gebruik ik enquêtedata van 125 koper-leveranciersrelaties.

In dit hoofdstuk beargumenteer ik dat kopers ondanks de voordelen van beslissingsbetrokkenheid hun leveranciers niet per definitie meer bij hun besluitvorming betrekken naarmate technologische onzekerheid hoger is. Ik poneer dat in gevallen wanneer de

middelenafhankelijkheid van de koper laag is terwijl de middelen afhankelijkheid van de leveranciers hoog is, de leverancier minder betrokken zal zijn bij de besluitvorming van de koper naarmate technologische onzekerheid hoger is. Ik redeneer dat in deze middelen-afhankelijkheidssetting de koper zijn organisatie van de leverancier zal afschermen en daarmee zijn competitieve voordeel en sterke onderhandelingspositie zal beschermen. Onder alle andere middelen-afhankelijkheidscondities verwacht ik een positief effect van technologische onzekerheid op beslissingsbetrokkenheid. De resultaten van de enquête bevestigen dit theoretische model.

Ten slotte vat ik de bevindingen van de drie studies samen en bediscussieer deze in **hoofdstuk 5**. Gecombineerd geven de bevindingen aan dat bedrijven hun macht gebruiken om ketenintegratie in hun belang te vormen. Enerzijds proberen ze de voordelen van het stroomlijnen van de middelenstroom in de waardeketen door integratie te behalen. Anderzijds nemen ze tegelijkertijd ook de kosten en risico's van integratie mee. Aangezien de drie aspecten van ketenintegratie verschillen met betrekking tot hun voordelen, kosten en risico's, ontwikkelde ik een aparte redenering hoe macht zich tot elk aspect verhoudt. Zoals ik in de vorige hoofdstukken uiteengezet heb, ondersteunen de resultaten deze redenering.

Deze bevindingen hebben implicaties voor zowel theorie als praktijk. Ik liet zien dat de verschillende aspecten van ketenintegratie verklaard worden door macht, of, in andere woorden, dat integratie het belang van de machtige dient. Als zodanig heeft dit proefschrift aangetoond dat macht een belangrijke rol speelt in koper-leveranciersrelaties en meegenomen moet worden door zowel academici en managers. Dit proefschrift heeft daarnaast bijgedragen aan de literatuur over ketenintegratie en het begrip van managers door niet alleen de voordelen van ketenintegratie te belichten maar ook nadruk te leggen op de kosten en risico's van de verschillende aspecten van ketenintegratie. Al met al heb ik hiermee twee zaken beargumenteerd en aangetoond. Ten eerste heb ik laten zien dat elk ketenintegratie aspect apart beschouwd moet worden aangezien de aspecten van elkaar verschillen met betrekking tot hun voordelen, kosten en risico's. Ten tweede heb ik gedemonstreerd dat bedrijven in het algemeen voorzichtig moeten zijn omtrent ketenintegratie; er zitten niet alleen voordelen aan maar het kan het bedrijfsbelang ook schaden.

Terwijl ik hoop dat dit proefschrift de bestaande kennis over de link tussen macht en de verschillende aspecten van ketenintegratie heeft vergroot, zijn er vele mogelijkheden voor verder onderzoek. Bijvoorbeeld zou het interessant kunnen zijn om ons begrip verder te vergroten van hoe macht de prestatie beïnvloedt die bedrijven behalen door hun relatie met hun leverancier c.q. koper, en de rol die ketenintegratie hierin speelt. Verder zou ik onderzoek willen stimuleren

over de ‘optimale’ ketenintegratie in een bepaalde (machts)context, of en waarom (machtige) beslissers afwijken van dit optimum, en wat consequenties hiervan zijn voor de betrokken bedrijven.

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ACKNOWLEDGEMENTS

This thesis is the result of a long journey which was as much scientific as personal. I would like to thank several people who accompanied me on this journey and helped me reach the destination.

First, I would like to thank my supervisors: Eric Molleman and Taco van der Vaart. Eric, I'm grateful for your detailed feedback on papers and for keeping up your high academic standards. It made me aspire to be a better researcher. Taco, thank you for your guidance in reaching the aforementioned high academic standards. You helped me lay the fundament upon which this thesis was built.

Next to my supervisors, I had many other mentors in science and life during the past five years. The list below is incomplete and the words to express my appreciation for you are too few. Despite these shortcomings, I will make an attempt to mention some of you who left their footprints during the last years. I will address you in no particular order.

To start, I would like to thank the colleagues from the department of Operations who became good acquaintances and some even very close friends. Thanks to my roommates Cees ("Wat een heerlijkheid!") and Monique for filling the office with hard work and 'gezelligheid'. Thanks to my Fresh Connection mates Tim, Erik, Remco, Arnout, and Bart. Participating (and winning) the national supply chain management competition with you twice inspired my research, but most and foremost was a great experience together. Thanks to Jan-the-Man, Batman-Nick, Whiskey-Nick, Oskardo, Linda "that dough needs more kneading and that fish needs more cleaning" Zhang and Gwenny Berry for our warm social contacts and inspirational conversations. Special thanks to Batman-Nick for the inspirational research conversations and many helpful comments. Whiskey-Nick, collaborating with you on "Practicum 2" made the course bearable and enriched my knowledge of good Italian food and whiskey. Thanks to the 'cool' PhD students Rambert, Justin and Veldmuis for being their cool selves. Special thanks to Onur for letting us dress him up like a sheep for his Beeh-chelor party. Finally, thanks to Wout van Wezel and Gerard Gaalman for their guidance in my first year of the PhD, and their support with my Bachelor thesis which motivated me to pursue a PhD in the first place.

Also thanks to my many friends and acquaintances throughout the faculty. My economist friends, I thoroughly admire your academic skills and creativity, as well as your ability to have a fantastic life outside of academia. This includes doing triathlons, composing music, travelling around the world, climbing high mountains, but also absorbing respectful quantities of alcoholic beverages. Your example got me to believe that greatness in academia and a passion for life go

hand-in-hand and should be aspired by all researchers. LJ and Ali, I foremost thank you for your sincere friendship, but also for your kindness to think with me about scientific issues and teach me (what in our field are considered) novel ways of doing research. LJ, I am happy that we have published our first study together and I am looking forward to our future joint ventures. Killian, thanks for your frank insights and opinions about science, life and love, and our joint book chapter endeavor which originated from them. Thijs, thank you for your help with SEM (which I eventually did not use in the thesis but which I intend to use in the future). My Kilimanjaro friends Zeehond-Baas-Peter, Smurf-Peter, Schuri-Peter, Ali, and Jesús: I absolutely loved our time together in Africa. When the going gets tough, there is just one thing to do: "Gewoon doorlopen". Thanks also to the BEAST volleyball team (a.o. Maaike, Tu, Umed, Javid, Ineke) for showing faculty spirit and kicking ass together. Thanks to the PhD committee members (a.o. Hotho, Hans, Janneke, Katrin, Zeehond-Baas-Peter) for jointly organizing activities for three years. Jan, my social events and tea time buddy, I very much enjoyed our collaboration and the solid friendship that arose from it. I hope to keep in touch with you and Petra (and the kids and of course the cats ;)) for many years to come.

Thanks to my many EUROMA friends for discussing research proposals and papers and for partying hardy at the annual doctoral meetings and conference. Thanks to Ruggero for your humor, good spirit and our first research exchange. Thanks to Paul for running on the lawn of King's College in Cambridge with my stilettos. Thanks Andrew and Mihaela for our friendship which resulted in numerous late night Skype conversations, several visits and joint holidays. On a more serious note, I am very grateful to the many teachers at the EUROMA events which inspired me and my fellow PhD students to keep going and make a contribution to our field. Among others, I would like to thank Chris Voss, Harry Boer, Rui Sousa, and Pär Ahlström.

The supporting and policy making staff of the Faculty of Economics and Business also deserves my gratitude for the kindness and help throughout the years. First, from the Operations department, thanks to Linda, Marjo, Renny, Ellen, Durkje, and Marco. Second, from the SOM bureau, thanks to Ellen, Astrid, Betsy, Arthur, and Rina. Third, thanks to Henk and the ladies from the canteen for brightening up our lunches. Fourth, thanks to Ennies for keeping the office tidy, for the laughter, and for the tasty home-made Indonesian treats. Fifth, thanks to Aafke and Tonnie for managing the facilities and quickly solving all problems that may occur in the process of moving. Sixth, thanks to the Faculty Board and especially Teun van Duinen for being awesome and supporting faculty-spirit building initiatives such as the Kilimanjaro expedition, The Fresh Connection, the PhD committee, and the annual volleyball tournament.

Thanks to the students which I supervised and coached throughout the last years. I learnt at least as much from you, as you learnt from me. It was a pleasure to discuss scientific topics with the many bright students that I supervised.

Thanks to the firm where the case study data mentioned in this thesis was collected. Especially thanks to Paul and Sven, who were my contacts at this firm. Thank you for answering the questions frankly and patiently for many hours, and providing me access to your key suppliers. I am highly indebted to you.

Thanks to my next employer for showing interest in my work and giving me something to look forward to after the PhD. Wout and Sander, thanks to you my first year at the VU was fantastic.

Thanks to my friends whom I met during our undergrad studies and who stuck with me in 'good and challenging' times throughout the years. Ro, thanks for our evenings of SATC and laughter. Fra, thanks for our "Wat zijn we toch goed" moments. These moments were usually caused by a good glass of wine and meal after some special activity such as a Bob Ross painting workshop, a paranormal fair, a wine tasting or climbing Mount Paradiso (and not dying in the process). Bian, thanks for being my friend and roommate in Groningen. I loved our late-night debates about politics and the meaning of life at 2 AM in the kitchen. I promised Frank and Bianca early in my PhD that they would be my paranymfs; I am very happy that they took on this task and stand beside me on this special day.

Thanks to my family and foremost my mother for always believing in me and supporting me. Mam, you have been there for me throughout the years. I cannot express my gratitude, love and appreciation for you. Thanks to the Mulders (Sieny, Abel, Martin, Annelie) for making me feel welcome. Finally, thanks to my favorite Mulder simply for being you. Ar, I feel very lucky to have met you.